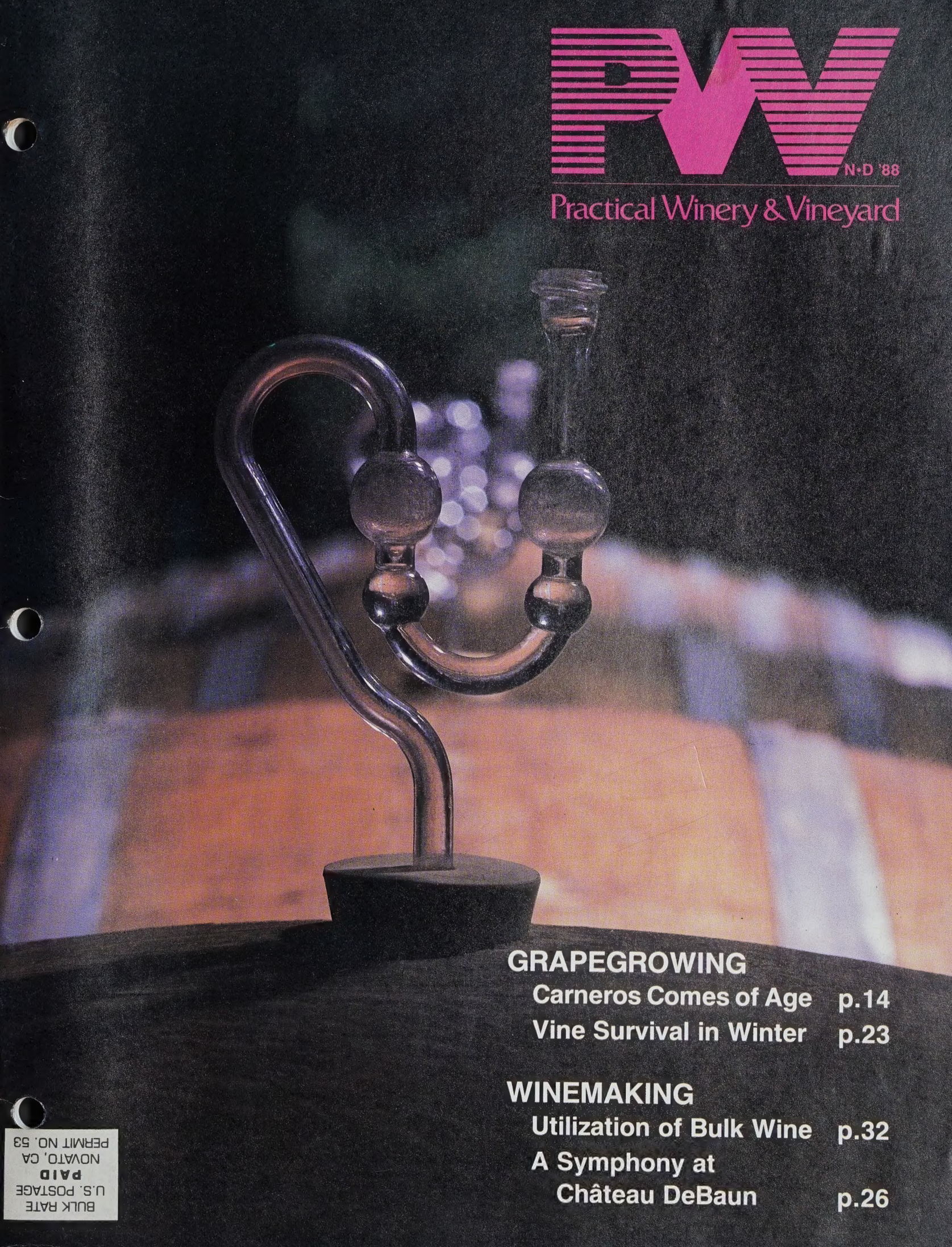

PW
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Practical Winery & Vineyard

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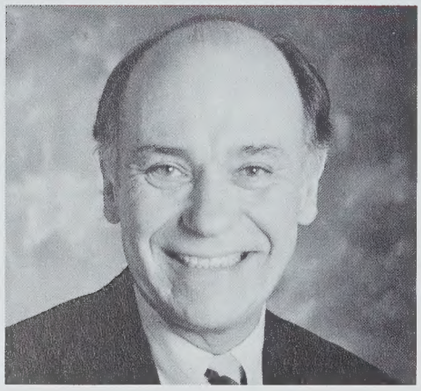

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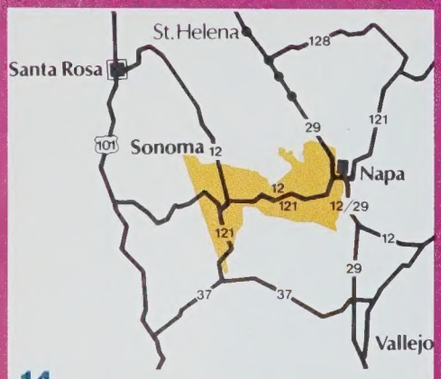

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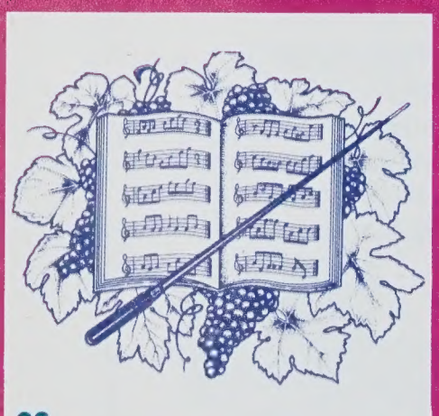
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COVER: Barrel Fermentation photo by Scott Clemens.

Wine & Health

Wells Shoemaker, MD

The Sham Pain of Bubbly Wine

Champagne reigns as the elegant beverage of great beginnings and happy endings—of betrothals and births, valor and victory.

Yes, yes, but will you still love me tomorrow? After the bubbles have burst, some celebrants moan that fizzy wine tolls a D-minor dirge upon their frontal lobes.

Is this doleful complaint an indictment of the effervescent wine, or does it reflect upon the frontal lobes (and adjacent tissues) of the plaintiff?

Two popular notions about the Dark Side of the Bubbly Force are that champagne gets you drunk exceptionally fast and that it causes rock quarry hangovers. Since most folk beliefs contain at least some element of truth, let's look at these two suppositions.

Does champagne cause accelerated intoxication? I'm not aware of any study measuring blood alcohol versus time which compares champagne and white wine of comparable ethanol content, but several facts would make a scientist skeptical.

Champagne doesn't boast a high alcohol concentration. The grapes are picked deliberately at low sugar concentration—17 to 20° Brix—in order to produce a low pH base wine of between 10% and 11% alcohol.

The 2.0 to 2.5% sugar added at *tirage* will raise the final alcohol content another 1.0 to 1.5%, but that's still on the low side of most table white wines.

Even though champagne doesn't pack a lot of alcohol, could the bubbles perhaps whoosh it into the bloodstream extra fast? I'm not aware of a study that tests this 'plunger effect' hypothesis, but, again, I'm skeptical.

Most of the carbon dioxide in champagne gasses off in the glass and in the mouth of the consumer. The CO_2 reaching the stomach quickly comes out of solution and is politely returned to the atmosphere. The intestines have to settle for warm, flat, white wine, which really should have similar absorption characteristics to still wine.

Many of us hold an attractive concept that carbonation hastens the passage of liquids out of the stomach by relaxing the pyloric valve. My gastroenterologist colleagues assure me that this effect does not occur. Since a significant amount of ethanol is absorbed directly through the stomach wall anyway, gastric emptying time plays little role in the champagne intoxication controversy.

The reputation for Concorde highs from bubbly wine likely stems from the style and circumstances of its use. Overdressed people who have been waiting in the church for three hours in July have nothing in their stomachs. They desperately need a large glass of ice water.

When these thirsty folks finally get to the reception, they find welcome release, old friends...and a glass of cold champagne. Before it's empty, someone fills it again. It looks like soda pop.

Happy folks on the lawn aren't counting refills, and they don't have the original bottle to serve as a visual reference for how much they have drunk. Three four-ounce glasses, friend, and you're well on your way to rosy cheeks, glory stories, and ribald presumptions.

In addition to the probably unfair rap of rapid intoxication, champagne is also accused of being a hangover fomenter. Since my wife suffers this rueful symptom from even minor dalliance with champagne, I must phrase my remarks carefully.

'Cheap' Champagne Hangover

Many people claim they get hangovers from the cheap stuff, but not from 'good' champagne. That's an interesting twist. From medical theory, at least, expensive champagne ought to cause more problems than plastic stopper varieties.

Méthode champenoise wine undergoes its secondary fermentation in the bottle and then lies in contact with the *tirage* yeast for years before disgorgement. Natural substances leak out of the exhausted yeast cells, contributing joyfully to flavor.

Unhappily for the unusually sensitive individual, other biologically active yeast products may enter the wine over the leisurely tirage interval. Organic amines in particular, the possible culprits in Red Wine Headache (see *PW&V* July/Aug'88), may cause unpleasant symptoms.

The Charmat process, by contrast, makes inexpensive sparkling wine in large pressurized vats. Efficiently filtered and bottled, the wine not only has far less time in contact with the yeast, but the yeasts are less completely autolyzed, with less intimate surface area exposure. The resulting bulk process wine has fewer elegant yeasty tastes, but also fewer of the mischievous yeast products.

Evil Sugar?

Does the sugar in cheap bubbly wrench your head? Certainly, bulk process sparkling wines usually have perceptible sweetness to please the palates of consumers and to partially cover the coarser characteristics of the base wine. Yet virtually all fine champagnes have small amounts of sugar in the *dosage* as well. Sorry to be un-Californian, but sugar doesn't cause hangovers.

Cheap grapes? Inexpensive San Joaquin Valley Thompson Seedless grapes may not have the refined flavors of a Sonoma hillside Chardonnay, but even inexpensive grapes contain no impurities or flaws that would cause a Morning After headache.

Fusel oils, the long chain alcohols produced during distillation which are thought to be a major cause of spirit-induced hangovers, are practically absent from sparkling wine. The amount of brandy in a traditional *dosage* is too small to contribute any effect and hardly any producer in California uses brandy in *dosage* anymore.

My mundane impression of the "cheap versus expensive" hangover controversy is that most ordinary folks just can't afford several bottles of top-of-the-line bubbly wine, and they are far more likely to treat it adoringly when they serve it. It's economically more practical to overdo it on a bottle or bottles of Charmat.

The occasional person hypersensitive to fermentation products will do better with a glass of white Riesling.

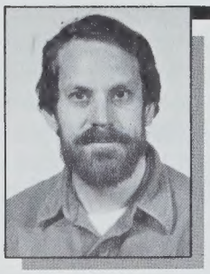
Degorgement—Conclusion

The wine industry has emphasized the healthful and traditional use of table wine with meals, but champagne remains a special occasion beverage in America, often consumed without much food and in a state of exultation.

Many people simply drink too much of it too fast, and then glower at the empty bottle instead of looking in the mirror.

Employing responsible servers at large functions and encouraging consumers to candidly assess their tolerance level will allow full appreciation of this extraordinary collaboration between Nature, Stars, and Winemaker. ■

Dr. Shoemaker produces a small amount of sparkling wine at Salamandre Wine Cellars, in Aptos, CA. Although suffering no malaise in its consumption, he's having a hard time getting it disgorged.



The Wine Retailer

Stan Hock

Selling Dessert Wine is No Piece of Cake

Given the immense popularity of wine coolers and slightly sweet blush wines, it would not be illogical to assume that American wine drinkers love a good dessert wine. It would, however, be erroneous.

Dessert wines have declined steadily in popularity in the U.S. since the table wine boom began in the mid-1970s. In 1987, they accounted for only 6% of the total U.S. wine market.

Despite the prestige and marketability of certain European dessert wines, notably Sauternes and Vintage Port, domestic producers of high-quality dessert wines have had a hard time persuading U.S. wine connoisseurs to take their products seriously.

Why? The best explanation is an historical one. As Leon Adams pointed out in his classic *The Wines of America*, Prohibition derailed the burgeoning U.S. table wine industry. Vineyards were abandoned or grafted to inferior varieties. After Repeal, the quality of dry table wines was abysmal, and the market for them correspondingly small.

The only wine grape products that sold well at this time were sweet, fortified wines, which federal tax laws had made the cheapest intoxicants available. The image of the streetcorner 'wino' clutching a brown-bagged bottle of muscatel, sherry, or port became etched indelibly on the nation's consciousness. Fifty years later, premium dessert wines still have not completely shed the albatross of their disreputable lineage.

"People still have preconceived ideas," says Andrew Quady, proprietor of Quady Winery in Madera, CA, one of the few California wineries to specialize in dessert wines. "They continue to associate sweet wines with Mogen David or with derelicts with brown bags."

The situation is improving, though, according to Quady, because today's wine drinkers are more open to trying new and different products. He also notes that by-the-glass sales of Vintage Port in fine restaurants have "changed the perception of dessert wines and opened the door a crack for other dessert wine producers." The key with dessert wines, Quady emphasizes, is getting people to try them. Also, they must be good.

"For a dessert wine to be successful, it has to be good," Quady insists. "You can sell a table wine that's pretty ordinary by pricing it right, but you can't do that with a dessert wine. If it's not going to be really good, you probably shouldn't bother."

Creative Marketing

Quady Winery produces 12,000 cases annually of four different dessert wines: Essensia (6,500 cases), a slighly fortified wine made from the Orange Muscat grape; Elysium (3,500 cases), a slightly fortified wine made from the Black Muscat grape; Vintage Port (sometimes called Port of the Vintage) made entirely from Zinfandel grapes; and Vintage Port—Frank's Vineyard, made from Portuguese port grape varieties grown in a

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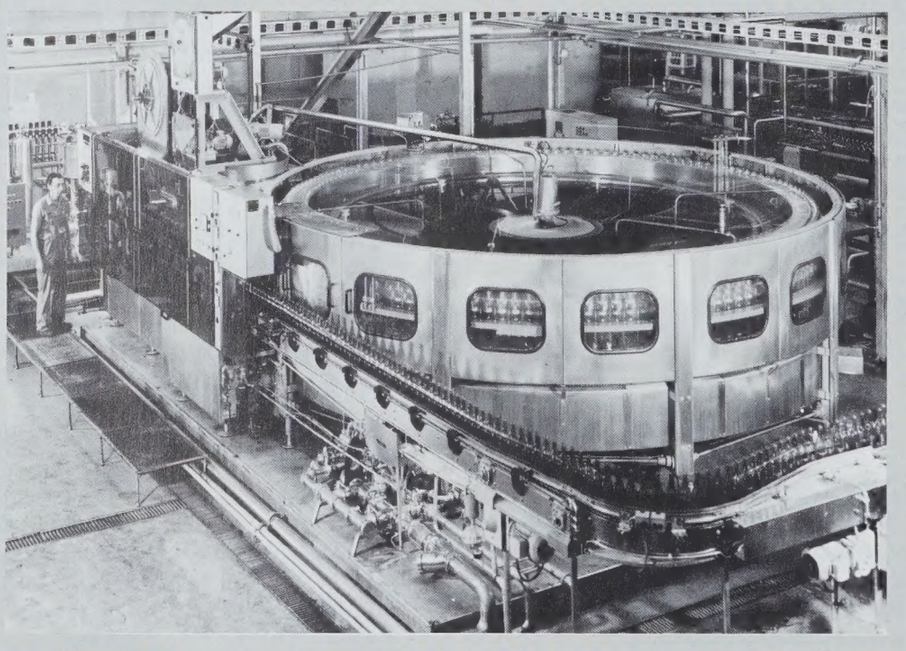

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vineyard in Amador County, CA owned by Frank Alviso.

Quady parcels out this small production to restaurants and retail shops in 46 states, Canada, and the United Kingdom. Many of his accounts, he says, sell no more than one case per year of the Quady wines they carry.

Quady has worked extremely hard, since his first port vintage in 1975 (Essensia was first produced in 1980, Elysium in 1983), to establish and secure his markets. He estimates that he spends 50% of his time on the road and has attended hundreds of tastings. The most productive and enjoyable of these events, he says, are those that enable him to demonstrate how well his wines complement a wide variety of desserts.

Although Quady's wines, like other dessert wines, are not usually consumed with food, he finds the idea of pairing his wines with desserts intriguing. "To be successful, matching a dessert with a dessert wine must be very carefully done."

Recently, for example, Quady conceived and hosted an affair in San Francisco that provided a showcase for his 1987 Elysium. Pastry chefs from 31 well-known California restaurants were invited to submit desserts designed specifically to complement this sweet, fragrant wine. The desserts were then judged on this basis by a panel of five prominent food writers.

The winning dessert, prepared by Robert Jorin of the California Culinary Academy, was a blueberry pear tart in a walnut black pepper crust with Roquefort custard. According to Quady, this imaginative concoction had just the right level of sweetness to accompany the Elysium.

Encouraging customers to try his wines with unusual desserts—and in the form of spritzers and champagne cocktails—is something Quady also promotes through neckpiece booklets on Essensia and Elysium and through his winery newsletter, called Dessert Wine Digest, which is sent to between 5,000 and 6,000 people.

"Restaurateurs send me recipe ideas, and I reprint the ones I try and like," Quady says. "The idea is to enhance the enjoyment of the wines. The Dessert Wine Digest also is a good way to communicate with the wine press."

Product packaging has been another key feature of the Quady marketing program. Both Essensia and Elysium bear strikingly modern, abstract label art and attractively designed neckpieces. The names of the wines have been important marketing tools too.

"We couldn't have been as successful as we've been without the label design," Quady states. "People have to be able to remember the product. Also, I think dessert wines with names that evoke warm, happy feelings are easier to sell than those that just have varietal names."

Despite the enormous amount of time and energy he's had to invest in promoting his unusual product line, Quady has no regrets. "I've enjoyed it," he says enthusiastically, "because we're doing something different than everyone else is doing. Over the years, I've really warmed to the creative challenge of marketing these wines."

Wineries whose dessert wines are only a small portion of their product line confront a different set of marketing problems: good customers for their table wines are not necessarily good customers for their dessert wines, and their distributors may not be receptive either.

"There's a very specific segment of the market to which dessert wines are attractive," says Bruce Neyers, marketing director of Joseph Phelps Vineyards in St. Helena, CA. "It took me a long time to learn the lesson that some of our best customers will never be customers of our dessert wines under any circumstances."

Phelps makes 2,000 to 3,000 cases of dessert wine in most years (none was

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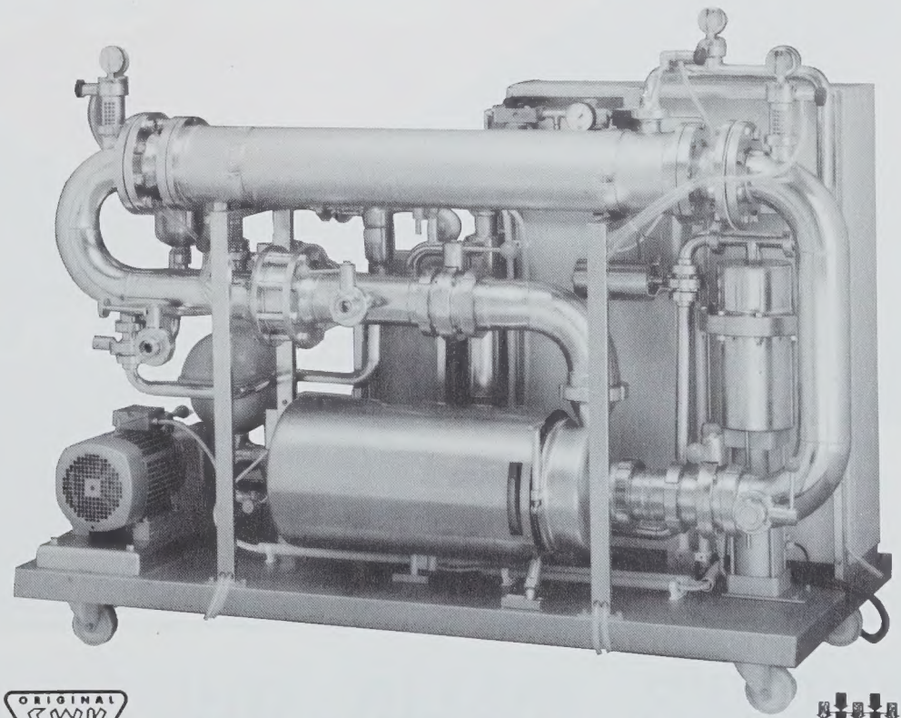

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produced in 1984 or 1987 due to lack of botrytis), out of a total production of 80,000 cases. Special Selection Late Harvest Riesling, with residual sugar of up to 29%, was first produced in 1975; Late Harvest Riesling (residual sugar between 7% and 11%) in 1977; Late Harvest Scheurebe (a Riesling-Silvaner hybrid) debuted in 1978; and Delice Du Semillon (85% to 90% Semillon, 10% to 15% Sauvignon Blanc) was introduced in 1983.

Neyers reports that the winery is satisfied with the sales performance of these wines (Delice Du Semillon sells out in a matter of weeks), but he notes that changes in the wholesale end of the wine industry have added to the problems inherent in marketing dessert wines.

"They don't easily fit into the conventional distributor program," Neyers remarks. "Many large wholesalers these days don't want to carry inventory for a year (the amount of time it may take to sell a vintage of a high-priced dessert wine). It's too expensive for them."

Still, being known as one of California's premier dessert wine producers does have its advantages. Phelps is often asked to provide the dessert wines for special, high-profile industry events, such as the View From the Vineyards dinner in New York City. And fans of the wines make pilgrimages to the winery to purchase them.

Tasting rooms are the ideal setting in which to convert those who still think of sweet wines as lowly beverages guzzled by streetcorner derelicts. At Shenandoah Vineyards in Plymouth, CA (Amador County), 40% of tasting room sales are of the winery's three dessert wines—Vintage Port, Orange Muscat, and Black Muscat—although these comprise less than one-tenth of the winery's 55,000 case annual production.

Proprietor Leon Sobon, who admits to having a sweet tooth himself ("Port is my number one love"), believes that tasting rooms provide the perfect venue for overcoming consumer resistance to dessert wines. "People say, 'Oh no, I don't like dessert wines,' " Sobon reports. "You really have to cajole them. But once they try the wines, most really like them, and they end up buying." ■

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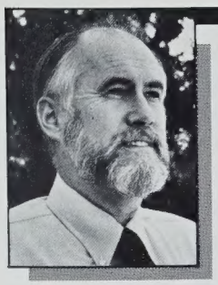


Winery Water & Waste

D.R. Storm, Ph.D, P.E.

A Box is a Box is a Caja

Mechanical harvesters, plastic tubs, and monogrammed polyethylene lugs have all but replaced the 50-pound fruit lug box, the grape picker's container of choice and necessity for nearly 70 years. Our winery is blessed or cursed, depending on your perspective, with about 400 antique but still functional lug boxes, into which we harvest grapes each and every year.

Grape pickers consider wooden lug boxes to be a pain in the neck and points below. The Spanish four-letter word for box is "caja," which said with the right intonation sounds very derisive, at least to this antique box owner.

Protruding wooden slivers and a few loose nails can spell disaster in two ways—a wounded finger for a picker or loader and, worse, a nail which falls from the box into the stemmer-crusher, often bringing the must pump impeller to a screeching halt. The downtime to dismantle the pump, remove the nail, and reassemble has been trimmed at our winery to 12 minutes. Like the U.S. Marines with their M-16 rifles, we could probably do the repairs in the dark.

We have tried to circumvent the troublesome box problem by inspecting each one for loose sides and bottoms and protruding nails prior to putting the boxes in service each year. This helps, but it has not eliminated the loose nail syndrome entirely.

Fortunately, there are still wooden box factories that produce spare parts for 50-pound lug boxes. When the replacement parts are no longer available, I will retire the "cajas," which will most assuredly precipitate a local fiesta to celebrate their demise.

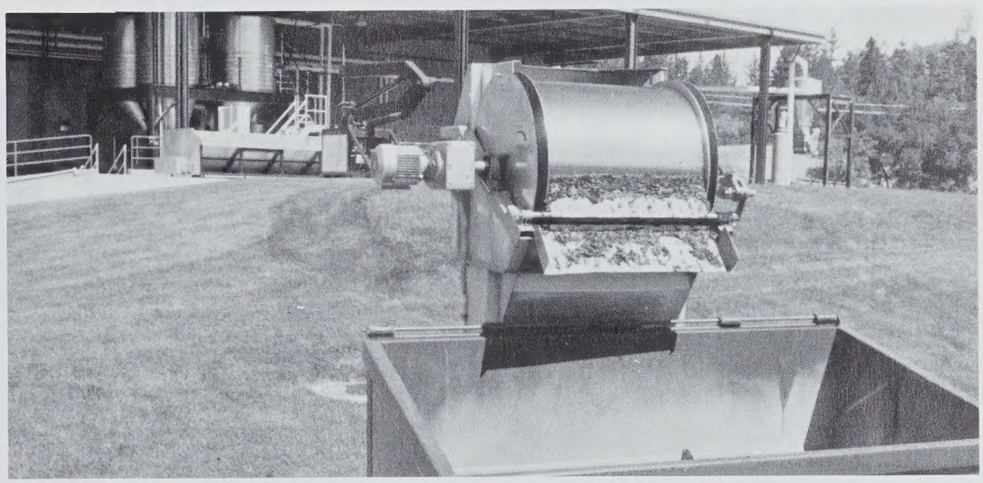
Process Wastewater Strainers and Screens

Why Screen?

An oft-repeated theme in this column is that wineries, whenever possible, should reduce solids loading on process wastewater treatment systems. The long- and short-term benefits vary considerably from system to system depending upon whether they are low-technology, septic tank/soil absorption systems or high-technology, aerobic reactors and clarifiers.

Most wineries and their production staffs are already familiar with the process of solids separation and perform the several steps each vintage using dejuicers (gravity juice separators), drag or cleat mechanically operated screens, vibrating screens, or rotary drum screens.

Using these pieces of equipment and several others that will be subsequently described, a high degree of settleable and suspended solids removal can be achieved with a low capital investment and modest annual labor and operating costs. The net savings to the waste treatment system can be significant and equated to the pounds of BOD that will not require treatment.



Rotary Screen

Definitions

Strainers are, at least by my definition, non-self-cleaning, batch-type solid collectors, similar in function to a kitchen colander or sieve. Once filled, they must be manually emptied.

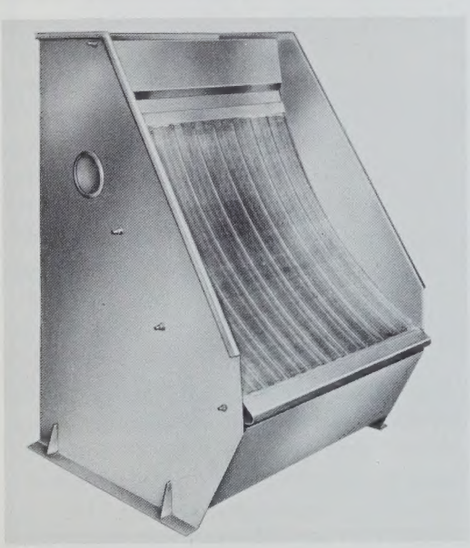
Screens, whether static, belt, or rotary drum, are semi-self-cleaning, continuous-flow devices that discharge the accumulated solids to a container or screw auger pit for ultimate disposal as solid waste.

Screen and Sieve Scales

A screen is generally specified by the number of openings or meshes per square inch or (metrically) per square centimeter. 'Sieve numbers' are determined by counting the number of openings per linear inch.

The American Society for Testing Materials (ASTM) has standardized sieves to insure grain or particle size uniformity for, among other purposes, the gradation of soils, cement, and other construction materials.

Comparative ASTM sieve sizes are shown in Table 1 in relationship to the smallest particle in the wastestream that a winery should attempt to screen or sieve, *i.e.*, the grape seed. The tear shape of a grape seed suggests that the



Hydroscreen

TABLE 1

Comparative Sieve Data[4]

ASTM Sieve Number (holes/linear inch)	100	50	40	30	10	8	4
Sieve opening (inches/mm)	0.0059 0.15	0.0117 0.30	0.0165 0.425	0.0232 0.60	0.0787 2.00	0.0937 2.36	0.187 2.75

(2.00mm is the maximum allowable sieve/slot size for entrapment of grape seeds.)

screen or slot size for a winery waste stream should be equal to or less than the maximum dimension at the bulbous end of the seed—about 2mm. (The average wine grape seed is about 4mm x 1.85mm.)

Slots vs. Holes vs. Mesh Openings

From a pure entrapment standpoint, and to maintain the longest screening run without clogging, a continuous slot with a tapered opening (wedgewire screen) is probably the best screen aperture geometry.

For example, the technology of water-well screens to exclude especially troublesome sand particles has been brought to a high level of science and engineering by the judicious design of the screen openings.

The simple logic is that a hole or square opening has the ability to hold the particle at as many as four points of contact whereas a continuous slot, because of its geometry, can only make contact on the particle at two locations, thus helping to augment screening media cleaning by tangential spraying, backwashing, or vibration.

If your winery requires a screen replacement or is planning a retrofit, check with several industrial screen suppliers to obtain cost and engineering data on screen materials, which you will find come in a variety of standard and alternative fabrications (304 or 304L stainless steel, polyvinylchoride, galvanized low-carbon steel or plain low-carbon steel, aluminum and fiberglass).

Screening Equipment

Four principal equipment types are available for winery wastewater screening applications:

1) Inclined static screen (also known as a ski-jump or cascade-type screen),
2) Rotary drum screen,
3) Traveling screen, and
4) Centrifugal screen.

The static screen has a number of idiosyncrasies that have to be reckoned with:

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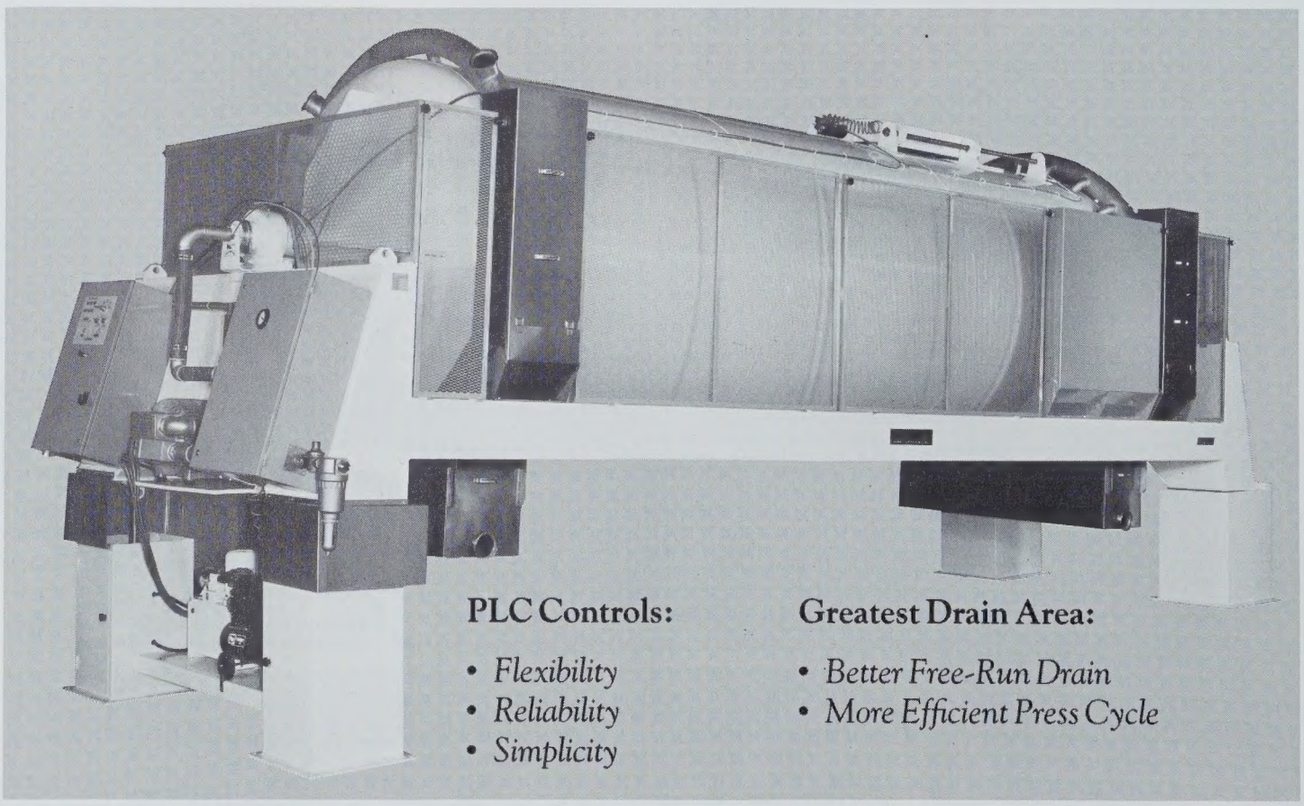

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1) About seven feet of hydraulic head is lost from intake channel to discharge flange. (Larger capacities are achieved by widening the screen, so elevation losses remain constant regardless of capacity).

2) The solids accumulator below the lip of the screen tends to drip even with the best of designs, creating an unwanted liquid component in the collector that must be dealt with.

3) While the pull of gravity tends to move most trapped solids off the face of the screen, the process is not 100% effective.

The simplest solution for handling the liquid is to place a drain under the solids container which can be directed back to the raw water sewer or to a sump for redirection back to the waste stream.

The drainhole in the bottom of the solids container should contain a hemispherical-type screen (landscape drain cover) that will exclude solids but pass the accumulated inclined screen drip-water. Drip gutters installed under the lip of the screen have also worked successfully.

The static screen can still be utilized under a pump lift configuration if the six or seven feet of hydraulic head is not available.

Other Solid Separation Systems

Over the years, the Storm Engineering design office has found applications for other types of screening/solids separation systems, such as plate settlers (lamella settlers), which are generally useful if the suspended material will obey Stoke's Law and can have its collective decay rate or sedimentation rate mathematically described.

There is also a proprietary device called the 'Teacup Strainer', which uses counterflow and vortex flow to separate suspended sediment from a waste stream. A very large industrial basket-type strainer (but in this instance self-cleaning) is also available from G.A. Industries.

This particular piece of equipment has been designed to handle flows as large as several hundred cubic feet per second, but scaled-down model prototypes can undoubtedly be fabricated using the same hydraulic and hydro-mechanical cleaning system.

Cost

Cost can range from as little as $6,000 for a stainless steel 200 gpm static screen to approximately $20,000 for a comparable capacity rotary drum screen. Compare capital and estimated operating costs of several types and assess whether such a screening sub-system can yield the operating and wastewater system life cycle benefits that you desire. ■

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David Storm is a Consulting Sanitary Engineer and owner of Winters Winery.

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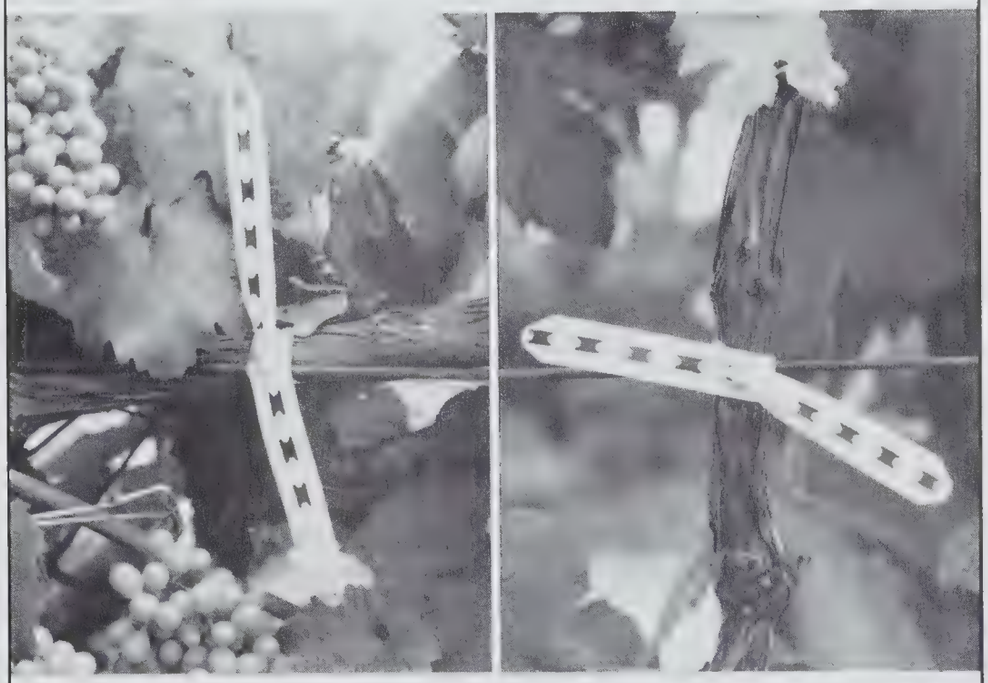

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Risk Management

Wineries face risks of various types, all of which need to be managed.

When we speak of risk management, however, we are usually referring to the kinds of legal liabilities which have traditionally been covered by insurance. In *PW&V* (Sept/Oct'88), we noted the necessity to manage the risks of industrial accident liability, premises liability, dram shop liability, and product liability. In all these areas insurance contracts will probably be an important tool, but there is more to it than that.

Risks must be managed in part by good business practices that decrease your exposure. Well-managed businesses combine insurance coverage with an internal program that identifies the areas of hazard and takes steps to reduce risks to those which are necessary to the achievement of business objectives.

Off-site Hazards

In this column, we will look at one area of exposure that wineries have in common with taverns and other on-premises licensees: dram shop liability.

Dram shop liability refers primarily to claims by third parties injured by someone who drank too much in the course of an activity at least partly under your control. In some cases, such as serving an under-age consumer, overindulgence may not be required.The claim can also come from the customer who hurts himself.

Although there are cases arising from fights in bars, in a typical dram shop suit the immediate cause of the injury occurs away from the licensed premises, all too often on the highway. Evidence indicates that alcohol by the drink was involved, and the purveyor of the beverage becomes a defendant.

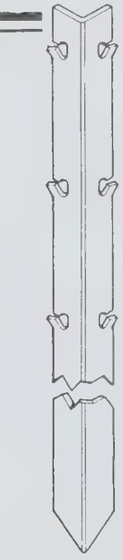
Basis of Liability

The legal theory which makes a provider of drinks liable for the acts of the drinker varies from state to state.

Dram shop liability originated in the common law principle that a tavern violates a duty to the public if it continues serving a customer after he or she has lost the ability to stop drinking. There are a few statutes in the U.S. that impose liability, but by and large the law at this moment represents various judicial developments of the common law concept.

One development of importance is that, in general, the duty to stop serving arises well before the consumer has drunk away his will power. States vary on this, but broadly speaking you incur liability when you serve alcohol to a person while having reason to believe that it may lead to a level of intoxication affecting his or her ability to drive.

In most places (but definitely not all) a commercial context, as distinct from a purely social gathering, is necessary for liability,but sale is not required. Free samples at a tasting room, complimentary wine for customers or employees, or other hospitality uses by a business which promotes wine is sufficient to supply the commercial nexus.



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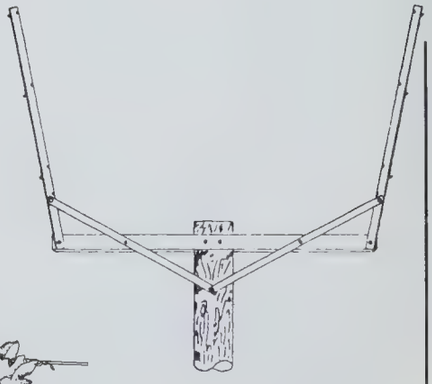

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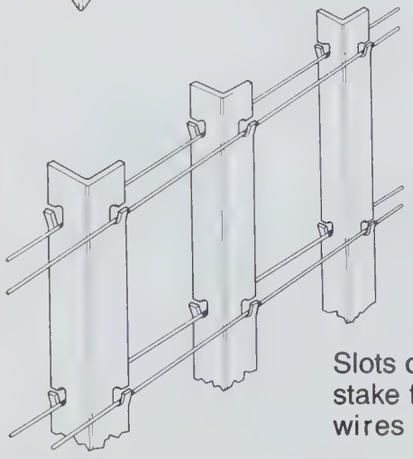

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Program Objectives

If you are located on a 'wine road' and have a tasting room, there is a good chance that one day a customer will arrive with a blood alcohol level near the point where his or her ability to drive is affected.

A principal risk management objective is to train tasting room staff to recognize this situation so that the customer consumes no more alcohol on your premises and, if possible, does not leave your premises as an impaired driver. Insurance companies, industry associations, and some liquor boards can provide useful information about such training.

Unfortunately, most available literature and training programs are geared to taverns, where the context is quite different, so you need to adapt the materials. You may also have to readjust your thinking about the kind of business you are in and adopt some of the ploys taverns use to keep affected consumers from driving their cars.

When you deal with over-indulging tasters, it is important to be consistent. For example, designated driver programs are well respected, but participation will work against you if your staff do not take it seriously. Having rules that are only sporadically followed can increase your exposure and may be worse than no rules at all.

Picnic areas where customers take bottles purchased in the tasting room are another source of concern. Discuss with your legal adviser the implications of having unsupervised consumption on your grounds or in any location which you arguably have a duty to oversee.

The other part of the program is insurance. Be sure it covers you not only at your tasting room, but also at festivals, off-premises tastings and the post-crush party in the cellar. An insurance agent who understands your business is an indispensable resource in selecting the right kind and amount of coverage.

Limitations

Even a good risk management program cannot entirely eliminate the risk of being sued.

For example, if a person 'doing' the wineries along the wine road ends up with a high blood alcohol at the time of an accident, everyone who served him, even when he was cold sober, is a target for legal action.

It is a feature of off-site liability that you cannot know if your one-ounce pour will be followed by a double martini, or if a negligible blood alcohol is already on its way up as the alcohol from the last three winery stops is absorbed.

On a Positive Note

There is good news, of a sort.

Recently, some plaintiffs have attempted to extend off-premises dram shop theory into the realm of product liability. Claims have been based on a manufacturer's failure to warn on a bottle of alcohol that consuming too much of it will impair one's ability to drive. The objective is to bring the manufacturer in as a defendant when the consumption occurs at home, in a restaurant, or, possibly, in a winery parking lot. As of this writing, these efforts have been unsuccessful. ■

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CARNEROS COMES OF AGE

Julie Morrison

A recent flurry of land purchases in California's Carneros viticultural appellation (which spans the southern tips of both Napa and Sonoma counties) has focused attention on this developing region, highlighting both a growing emphasis in California on micro-climate and the increasing scarcity of plantable acreage.

In the past year alone, over 1,800 acres of land in Carneros changed hands; 70% was purchased by upper Napa Valley wineries, including Grgich Hills, Robert Mondavi, St. Clement, Shafer Vineyards, Silverado Vineyards, Sinskey, and an affiliate of William Hill Winery. Cordoniu and Viansa Winery also purchased sizeable acreage. In addition, many existing Carneros vineyards and wineries have expanded plantings or land holdings.

While the total Carneros land surface is approximately 36,000 acres, only 15,000 is plantable. About 7,500 acres currently are in vineyard. Additional plantings of over 2,000 acres are slated over the next five years, 50% of which will be undertaken by newcomers to the region. Projected plantings will be primarily Chardonnay and Pinot noir, with minor amounts of Cabernet Sauvignon and Merlot.

Investment in the Future

The main factors in the wave of Carneros land purchases by Napa wineries are the scarcity of Napa Valley acreage and the escalating prices of premium grapes. At Shafer Vineyards, which recently purchased 83 acres in Carneros, Doug Shafer notes that the rush to buy land is spurred by a belief, shared by many Napa vintners, that there soon will be a shortage of premium grapes.

"With a fixed number of acres in Napa Valley," says Shafer, "it is becoming increasingly clear that grape prices will continue to rise as demand becomes stronger. We intend to control our grape sources as much as possible in order to control both our wine quality and the price to the consumer."

Many of the wineries purchasing land are already very familiar with Carneros fruit, having bought grapes from the region in the past. They consider Carneros grapes, particularly Chardonnay, to be an integral part of their primary Napa Valley blend.

John Stuart, general manager/winemaker of Silverado Vineyard explains, "We were particularly interested in Carneros with respect to Chardonnay. I like having that blending option. I've found over the last two vintages that blending some Carneros fruit with our home ranches in Stags Leap and Yountville works very well."

S. Anderson Winery, which now owns 70 acres of Carneros land, expanded its

Domaine Carneros

vineyard holdings for a different reason. In addition to producing Chardonnay, the winery also makes sparkling wine. The high acid levels and low pH levels of Carneros Chardonnay and Pinot noir grapes make them an attractive part of a sparkling wine blend. "In the future a good component of our sparkling wine will always be from the Carneros area," said John Anderson.

The largest new vineyard development in Carneros will be undertaken by Robert Mondavi Winery, which purchased a former dairy property of 482 acres. Chardonnay and Pinot noir are the leading contenders for the first Mondavi plantings, scheduled to begin in 1989.

Oldtimers and New Wineries

Newcomers to Carneros are not the only ones to plant new acreage. A multitude of Carneros growers and wineries have planted new vineyards in the past three years. Together, Buena Vista, Gloria Ferrer, and Saintsbury wineries and growers Hudson, Truchard, Beckstoffer and Roche vineyards have planted over 350 acres between 1986 and 1988.

In addition, Sangiacomo Vineyards, after purchasing 200 acres of vineyard from Geyser Peak Winery in 1986, budded over 80 acres of Riesling, Gewurztraminer and Sauvignon Blanc to Chardonnay, Pinot noir and Merlot. Buena Vista budded over 55 acres of Riesling and Gewurztraminer to Chardonnay and Cabernet Sauvignon.

Beaulieu Vineyards has replanted 87 acres to Pinot noir and Chardonnay. Coming into production in 1989 will be 238 acres planted by Buena Vista, Carneros Creek and Mont St. John wineries and Hyde, Sinskey, and Truchard vineyards.

Carneros also has its share of new winery startups. Most visible is Domaine Carneros, a joint venture of Champagne Taittinger, the Kobrand Corp., and Peter Ordway, which is presently under construction in the heart of Carneros, directly across from the Winery Lake Vineyard.

Soon to be completed, the $11 million Domaine Carneros facility was christened with the 1988 harvest, which yielded 15,000 cases of sparkling wine. Production levels will rise an average of 25%/year until a maximum of 60,000 to 75,000 cases is reached. At the helm is managing director Eileen Crane, former winemaker and vice-president of Gloria Ferrer Champagne Caves.

The wine is designed to be a classic blend of 60/40 Pinot noir and Chardonnay with small amounts of Pinot meunier and Pinot blanc. Domaine Carneros is the only sparkling wine facility which currently draws 100% of its fruit from the Carneros region.

"It wasn't long ago that few people were confident about the quality of sparkling wines that California could make," says Crane. "Over the past 20 years, we've realized that California, particularly Carneros, can make very fine sparkling wines. We believe it can be a classic, world-class wine."

The strong belief in making world-class wines is underscored by the classic lines of the Domaine Carneros facility, inspired by the Taittinger-owned, historic Chateau de la Marquetterie in the Champagne region.

Hidden from sight in the center of Carneros is another new operation, Sonoma Creek Winery, a small, family-owned and operated facility. In 1987, 2,000 cases of Chardonnay, Pinot noir, Zinfandel and Cabernet Sauvignon were produced under the direction of winemaker Tom Larson and his father, Bob.

Larson made a Carneros-designated Cabernet Sauvignon from grapes grown in the Millerick Vineyard. The family plans to increase production up to a maximum of 10,000 cases over a period of three years.

Ground will be broken shortly on two new wineries which will be only a stone's throw from one another. Viansa Winery, a showcase winery to be built by Sam and Vicki Sebastiani, and Roche Winery will become the region's southernmost wineries.

Viansa (a contraction of 'Vicki' and 'Sam') is designed to be a replica of a Tuscan winery, Certosa di Farnetta, where Sam's grandfather, Samuele Sebastiani, first learned to make wine.

Perched atop a hill on a 175-acre parcel will be the Sebastiani's home, with detached kitchen and dining room, and a collection of buildings including the winery and office. The configuration of buildings will appear to be part of an Italian hill town, according to Sam.

"I wanted to create something in the California wine industry that expressed my heritage," Sebastiani explains. "I want to make wine in the same fashion that they make wine in Italy, with modern touches of course."

Sebastiani's plans include the planting of Sangiovese, a traditional Italian varietal, on the slopes. It will be used to produce a full-bodied red wine to complement his present product line. "Ultimately when we harvest the Sangiovese grapes, we will be making an Italian wine in an Italian winery." Viansa's production will be increased from today's present level of 10,000 cases to a maximum of 40,000/year.

Roche Winery is yet another family winery. Joe and Genevieve Roche, who have grown Pinot noir and Chardonnay grapes in Carneros since 1984, plan to break ground for a facility with a maximum capacity of 30,000 cases. Their first crush in 1988 is limited to 3,500 cases of Pinot noir, Chardonnay and Pinot Noir Blush, made under the direction of consulting winemaker Steve MacRostie.

Grower Tony Truchard plans to make wine when he finishes converting a barn into a small winery in 1989. Winemaker Michael Havens will produce under the same roof both a Truchard label and his own Havens label. Production of the facility will not exceed 8,000 cases.

Premium Viticultural Appellation

The focus on Carneros comes at a time when the region is gaining recognition as a premium viticultural appellation. Since its establishment in 1983 by the BATF, the Carneros appellation has emerged as the new kid on the block, demanding equal status with its big brothers Napa and Sonoma.

Although grapes were first planted in Carneros in the mid-1850s, the combined forces of phylloxera and Prohibition halted production. During the height of the widespread plantings in

California in the 1960s and 1970s, Carneros was generally thought to be too cool a climate and was largely ignored except by pioneers such as Louis Martini, Andre Tchelistcheff at Beaulieu Vineyards, and Rene di Rosa of Winery Lake Vineyard.

Because the area developed less rapidly than other areas further north in both counties, Carneros bypassed the height of the 'trial and error' period of California viticulture, and the costly mistakes of planting varietals ill-suited to the micro-climate were avoided.

By the time a full-scale viticultural renaissance occurred in Carneros in the late 1970s, growers were reaping the benefits of the evolution of California viticulture towards a focus on micro-climate.

Eileen Crane explains: "What is happening in California is we no longer are trying to do all things well. We're trying to become specialists and do fewer things extremely well. We have realized that instead of trying to produce six different varietals in an appellation, it might make more sense to concentrate on one or two."

In Carneros, this theory translates into the practice of planting almost exclusively varietals which traditionally excel in cooler climates: Chardonnay and Pinot noir. These two varietals represent over 85% of the current plantings.

Although the boundaries of Carneros fall within the confines of both Napa and Sonoma Valleys, the region's unique micro-climate is distinct enough to set it apart viticulturally. As the southernmost viticultural area in both valleys, Carneros is an especially cool growing area (Region 1) due to the marine influence of the nearby San Pablo Bay. Average temperatures are warmer in the spring and fall and cooler in the summer than areas further north.

In the springtime, the warming influence of Bay waters heats the air, nurturing an early bud break with minimal threat of frost. Throughout the growing season, the hot air masses travelling seaward meet the cool air masses travelling inland, creating a fog bank which typically descends in early evening and clears by midmorning.

The extra few morning hours of cool temperatures help the grapes retain the desired acid and pH balance. When the fog clears, temperatures rise and the vines soak up the sun's rays, edging the grapes to maturity. A breeze comes off the Bay by late afternoon and cools the grapes. This absence of temperature extremes lets the grapes mature slowly and evenly.

Evolution of an Appellation

As growers and vintners become better acquainted with the subtleties of the micro-climate and the varietals which do best in it, innovations adapted to the region are beginning to flourish.

Eugenia Keegan, President of Bouchaine Vineyards, feels that growers and vintners have developed together in their understanding of the region. "Carneros developed viticulturally hand-in-hand with the enologists developing in the winery."

Anne Moller-Racke, Buena Vista Winery Vineyard Manager, views the evolution of the appellation as a three-part process. "Carneros growers now have reached a good understanding of the region's soils and climate. The next step should focus on varietals. We are now in the second generation viticulturally. The third generation will be clones."

With over 800 acres of bearing acreage, Buena Vista is one of the largest growers in Carneros. An ambitious planting program begun in 1985 has added 230 new acres of Chardonnay, Pinot noir, Cabernet Sauvignon, Merlot, Sauvignon Blanc, Semillon, and Zinfandel, 180 of which are now bearing. Another 240 acres will be planted in 50-acre increments over the next few years.

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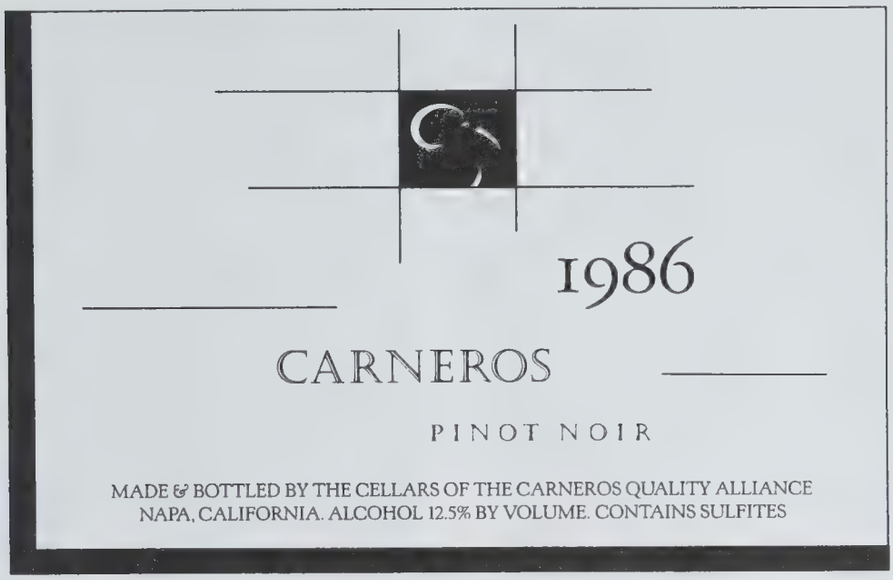
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the production of Cabernet Sauvignon in an area that many considered too cool. Approximately 20% of the winery's annual production, or 23,000 cases, is Carneros-designated Cabernet Sauvignon. Of the 250 acres in Carneros planted to Cabernet Sauvignon, Buena Vista currently has 200, and will plant more. Other growers of Cabernet Sauvignon include Gregory, Mont St. John, and Truchard.

Pinot Noir Passion

Although Carneros growers and vintners produce more Chardonnay than Pinot noir, it is the latter which stirs their passions. Finicky in nature, Pinot noir demands special treatment in the cellar and research in the vineyard.

Francis Mahoney, co-owner of Carneros Creek Winery, pioneered Pinot noir scion selection in Carneros and now has over ten years of hands-on experience. Having begun in 1975 with an experimental plot containing 20 scions, he narrowed his preferences down to a manageable six, including selections from Pommard, Martini, Martin Ray/Paul Masson and Stelling, all of which he planted on a commercial scale in 1985.

Mahoney harvested his first crop from the new vineyard in 1987 and speaks cautiously, but optimistically of the end product. "The 1987 wine is showing direction, but it is way too early to tell if selections or plantings are on the money. Preliminary results were extremely exciting."

Mahoney is not alone in experimenting with Pinot noir scion selections. Beaulieu Vineyards, which first purchased Carneros land in 1961 and presently farms approximately 400 acres of Pinot noir and Chardonnay, recently replanted a 14-acre plot to nine Pinot noir scion selections, including commercial as well as old California selections, a French Pommard, a Swiss Wadenswil, and selections from their own vineyards.

One selection, Petit Pinot, is claimed to be an original brought over by George de Latour shortly after he founded the winery in 1900. All selections are planted on AXR-1 rootstock; the first harvest (1989) is expected to yield 2.5 to 3-ton lots per selection.

A second and larger Beaulieu experimental plot is in the formative stages. A 12-acre parcel was planted to SO4 rootstock in 1988 and will be divided into four equal blocks in 1989. Two scions from the smaller experimental plot, Pommard and Wadenswil, and two different California scions will be grafted. Yields are expected to be substantial enough to supply large tank lots.

Tony Bell, Director of Operations, explains that by doing this Beaulieu is planning for the future, when large portions of the vineyard will need to be replanted. "We will have a broad selection of Pinot noir to work with," he says. Beaulieu will also have the advantage of generating their own budwood.

In 1988, Bouchaine Vineyards budded over five acres of Chardonnay to Pinot noir scion selections including Hanzell, Swan, Chalone, Pommard from Elk Cove in Oregon and Stony Hill from Lazy Creek in Anderson Valley.

Keegan is aiming to increase the diver-

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sity of selections. "Much Pinot noir in Carneros is budded from neighbors' wood. Perhaps with other selections which are low producers with small, non-conical, loosely clustered berries, we might get a little more intensity. We want to develop earthiness and middle-mouth textures."

Bouchaine's Pinot noir experimentation is not limited to scion selection. The winery has installed a pneumatic 'punch-and-pump' device. A 3-foot long pneumatic cylinder with an 18-inch round disc on the bottom is set on top of the must and controlled by an operator to perform the laborious task of breaking through the cap. A separate 1-inch hose connected to the base of the cylinder can pump-over at the same time, aerating and cooling the wine.

New Viticultural Techniques

As the region matures, better viticultural techniques are being developed to increase quality. Unlike other viticultural areas which have to fight to restrain plant vigor and maintain quality, Carneros growers are faced with the opposite problem. The cool climate and dense soils produce vines of low vigor and yield. The low vigor affects a grower's choice of both trellising system and spacing.

Many Carneros growers are experimenting with variations of vertical trellising systems. Although vertical trellising might not work in a warmer area with deeper, richer soils and higher water-holding capacities, in Carneros growers are optimistic that the new system will not only increase exposure, but will also offer unexpected benefits.

"It looks like the vines hold up better in the wind because they're positioned, and all the leaves are working all the time because they're not in the shade," explains Zach Berkowitz, Domaine Chandon's Carneros Vineyard Manager. "It seems like nutrition-wise they hold together better and stay healthy longer in the season. Clusters are bigger and there are more of them."

Currently farming 500 acres of Pinot noir, Chardonnay, Pinot meunier and Pinot blanc, Domaine Chandon will plant an additonal 300 acres over the next two years utilizing a vertical trellis and 8x6 spacing. Instead of placing a medium weight stake at every vine, a heavier and taller stake will be placed at every third vine.

"With machine harvesting, this system has a little more flex to it and getting the fruit off the vine is easier," says Berkowitz. "You can get a much cleaner pick, with virtually zero breakage." The single largest user of Carneros fruit, Domaine Chandon harvested almost 4,000 tons in 1988.

Sangiacomo Vineyards, which farms 900 acres of Chardonnay, Pinot noir and Merlot, installed a vertical trellising system on 80 acres at the same time that vines were interplanted, giving a 3.5x12 configuration as opposed to the original 7x12 spacing. The tighter spacing is expected to produce smaller clusters which will offset the higher vine count.

Movable catch wires are continually adjusted throughout the growing season to accommodate the increasing vegetation and to train the vines into an upright position. Because of the tight spacing between vines, the canes of adjoining vines are arched into a loop and positioned to meet in the middle, allowing full exposure of the clusters and

David Graves

reducing rot. "With the new spacing and trellising system, we hope to be able to increase yield without sacrificing quality," says Angelo Sangiacomo.

When planting a new Pinot noir vineyard in 1986, Saintsbury Winery opted for a quadrilateral cordon, open-lyre trellis with the idea of reducing shoot density in the canopy. The foliage is divided and separated into two canopies which are trained vertically.

While most California vineyards traditionally have shoot densities of five to six shoots/linear foot of trellis, the open-lyre has only three to five/linear foot. The lower shoot density results in very little leaf shading and therefore maximum photosynthetic capability. The fruit is also well-exposed, shaded from sunlight directly above, but exposed on the sides.

"The net result is that more fruit can be ripened with a smaller leaf area," ex-

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plains David Graves, Saintsbury co-owner. "Vine vigor is controlled in a more balanced manner by leaving more well-placed and fruitful buds at pruning. These primary buds are inherently more fruitful than secondary, tertiary or basal buds, which push when vines are more severely pruned than their vigor warrants."

Another technique employed by Carneros growers to maximize exposure and minimize rot is leaf pulling. Sangiacomo Vineyards alone performs the operation on over 350 acres, particularly on Chardonnay, which has a tendency to produce bigger clusters and canopies.

One continual problem confronting Carneros growers is the damage to fruit inflicted by the powerful southwesterly wind which comes up every afternoon. In addition to shoot positioning, growers have circumvented this problem by orienting the vine rows to follow the wind direction.

The high incidence of shallow, compacted clay soils, in combination with an irregular topography can be problematic for irrigation. In 1987, Beaulieu installed a state-of-the-art drip irrigation system which automatically controls the water flow small blocks receive. The vineyard is divided into 13 ten-acre blocks according to irrigation needs. Each block is directly connected to the centralized pumping system.

"We wanted to be able to apply finite amounts of water to various locations," says Tony Bell. "Maybe the top of the hill needs twice as much water twice as frequently as another block. With our automated system we have more control over our irrigation needs, allowing us to control yields and berry size to obtain higher quality."

The system is also equipped to expand its function in the future to include fertilization, or to be hooked up to evapotranspiration pans which would automatically direct the system to accelerate or decelerate the rate of irrigation according to the rate of evaporation.

Leader in New Regionalism

The recent attention lavished on Carneros comes at a time when the role of appellations is in hot debate. Because of its unique position straddling the Napa/Sonoma County line, it falls within no single political boundary.

Carneros has taken an aggressive stance in marketing, establishing a reputation as a leader in the field of appellation education. Much of the recognition it's gained is attributable to the efforts of the Carneros Quality Alliance (CQA), a promotional organization established in 1985 which consists of both growers and vintners.

One of the more unusual projects initiated by the Alliance was a research project to quantify the attributes of Carneros Pinot Noirs. Carneros vintners felt strongly enough that there is a 'Carneros' style of Pinot Noir and they sponsored an experiment to prove it. Working with UC Davis, it was determined that one is most likely to find fresh berry, berry jam, and spicy characteristics in a bottle of Carneros Pinot Noir.

CQA took the concept one step further and created a Pinot Noir to serve as a symbol of this style. Carneros vintners jointly blended tiny amounts of the best of their lots and produced a 'Carneros Pinot Noir'. The first vintage, 1985, yielded only 1,000 cases, which were distributed to six markets across the United States.

As the industry becomes more sophisticated, CQA President Eileen Crane believes, "People will come to associate wineries within a region with one or two varietals that the region is known for. Carneros is the leader in the new regionalism which is emerging. What's happening in Carneros will start happening in many other areas as well."■

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Winemaking for Profit

Gary Brayton

Winemakers in California, Oregon and Washington have achieved a standard of excellence with their wines that is recognized around the world. Have profits followed?

A recent financial survey of the wine industry conducted by Touche Ross & Co., San Francisco, CA, indicates that while the industry is profitable overall, profit levels lag behind food and beverage industry averages. Key findings of the survey indicate:

Price segment positioning is critical to profitability. High return wineries have ⅔ of their production in the fast-growing premium wine segment, while low return wineries produce over ⅔ of their wine for the shrinking jug wine market. Jug wine producers' speed in repositioning their product lines may be critical to future survival.

High gross margins are required to offset relatively high marketing costs and capital investment levels. The survey data suggests that gross margins of 45% are necessary to offset high marketing costs (18% of sales) and low asset turnover rates. Asset turnover (sales divided by total assets), a key measure of how well assets are utilized, average a meager 0.7 versus a food industry average of 1.7X. This is due to high levels of investment in inventories and poor utilization of facility investments.

Higher earnings on sales are driven primarily by the bottle price, not cost efficiencies. Strong brands focused in the premium wine segment consistently produced higher returns. Reasonably small increases in the cost of production (primarily higher cost/quality grapes) appear to result in disproportionate improvements in price and thus gross margin.

Survey Background

Until now, the California wine industry has not had a comprehensive source of segment-specific comparative financial information for owners, investors and lenders. As a result, winery managers and owners have not had industry benchmarks for financial performance. Furthermore, many outside investors and lenders have not understood the industry, and thus have avoided it altogether.

Touche Ross & Co. (industry audit, tax, and consulting specialists) and Hambrecht & Quist (investment bankers and venture capitalists) prepared a two-pronged approach to increasing the availability and quality of industry financial information. Touche Ross began an annual Wine Industry Financial Survey and Hambrecht & Quist agreed to sponsor an annual Wine Industry Financial Forum.

Objectives of the annual survey were to provide comparative measures of financial performance; enhance understanding of industry profitability and trends; and improve access to new sources of debt and equity financing.

Survey participants would be provided with a unique tool for understanding where and why people make money in the industry, with financial trends, and with comparative data both for the entire industry and for production-size segments.

A steering committee of winery owners, managers, chief financial officers, and staff from Touche Ross and Hambrecht & Quist participated in design of the survey. The survey collected data to compute financial ratios and rates of profitability, production costs, marketing costs, channels of distribution, and pricing.

The first survey included 101 wineries representing 56% of industry volume (excluding E & J Gallo and wine cooler production), with 43 million cases of production and $950,000,000 of F.O.B. winery sales represented.

Participants produced a representative mix of table wines by price segment. Of the total sampling, 57% was in the jug wine category (less than $3.00/750mL); 23% was premium wine ($3.00 to $7.00/750mL); 6% super premium ($7.00 to $14.00); 1% ultra premium (over $14.00/750mL); and the balance 'other' wine (desert, sparkling, etc.).

There were 92 California winery participants and nine from Oregon and Washington. Annual production volume of the participants was: 42 wineries under 25,000 cases; 16 between 26,000 and 50,000 cases; 11 between 51,000 and 100,000 cases; 15 between 101,000 and 250,000 cases; eight between 251,000 and 1-million cases; and nine over 1-million cases.

Survey Results

Perhaps the most important revelation of the wine industry survey concerns profitability. Although the average pre-tax ROE (return on equity) is only 13%, the top 25% of the participants achieved an average of 46% pre-tax ROE. This return rate compares very favorably with the 42% pre-tax ROE for other top performing companies in the food and beverage industry. However, wine industry investment is not without risk, as Table I shows the bottom 25% of wineries losing 45% of their equity investment.

In analyzing the components of return (shown in Table II), it is clear that high ROE performers have better returns on sales and much better utilization of assets, as indicated by asset turnover. Notably, financial leverage (assets

Table I — Pretax Returns

Return on	Top Quartile	Industry Average	Bottom Quartile
Sales	17%	6%	(23%)
Assets	15%	4%	(13%)
Equity	46%	13%	(45%)

Table II — Measures of Profitability

	Pre-Tax Return on Equity	=	Pre-Tax Return on Sales	×	Asset Turnover	×	Financial Leverage
High ROE (Top Quartile)	46%		17%		0.88 times		3.1 times
Average	13%		6%		0.70 times		3.1 times
Low ROE (Bottom Quartile)	(45%)		(23%)		0.57 times		3.5 times

Table III — Measures of Brand Strength

	High ROE	Industry Average	Low ROE
Average FOB, Price per Case	$30	$22	$14
Average Cost per Case	$16	$13	$12
Average Gross Margin/Case	$14	$ 9	$ 2
Average On-Premise Consumption	26%	16%	7%
Average Discounts (% of Sales)	4%	5%	13%

Table IV — Asset Management

	Asset Turnover (Multiple of Sales		
	High ROE	Industry Average	Low ROE
Inventory Turnover	1.8x	1.8x	1.5x
Non-Inventory Turnover (Primary Property, Plant, and Equipment)	2.1x	1.2x	0.9x
Asset Turnover	0.9x	0.7x	0.6x

divided by equity) is reasonably constant, suggesting financial institutions are now allowing greater leverage.

A further analysis of factors driving return on sales indicates that price premiums based on stronger brands result in higher gross margins. Table III shows that with a 25% higher input cost per case, high ROE performers command FOB prices over 100% greater than low ROE performers.

Additionally, the high ROE group appears to develop brand strength through focusing on obtaining higher on-premise consumption rates. A further indication of strength is reflected in the very low sales discount rates of the high ROE group.

Asset management appears to be the second most important factor leading to high profitability. While inventory turnover is low for both high ROE performers and low ROE performers, the high ROE group utilizes other assets twice as well.

This factor, non-inventory turnover, (sales divided by non-inventory assets) reflects how many sales dollars a winery generates relative to its investment in property, plant and equipment. In Table IV, most of the 50% higher total asset turnover advantage that high ROE performers enjoy is driven by their non-inventory turnover advantage.

Market segment positioning is a clear part of the profitability equation. Those wineries focusing on the premium and above price segment (over $3.00/750mL) have a clear advantage over predominantly jug wine producers.

The consumer trend toward drinking less, but higher quality, wine has resulted in a 20% per year growth rate in the premium segment. This contrasts sharply with the much larger jug wine segment, which is shrinking at a rate of 3% per year.

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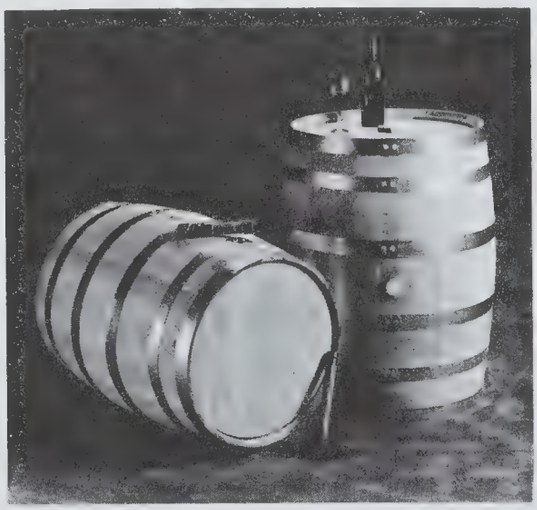

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The impact of these trends on profitability is shown in Table V. While the high ROE group has less than ⅓ of their production in jug wine products, the low ROE group has over ⅔.

Finally, minimum economies of scale appear to be a factor in achieving high investor returns. The survey data indicates that, on average, it is difficult for wineries producing less than 50,000 cases/year to be profitable (see Table VI). This may be due largely to threshold investment requirements in property, plant, and equipment, as well as to fixed selling, general, and administrative expenses.

In summary, the most profitable wineries are those that focus on the premium and above price segment, have strong brands, carefully manage capital investments consistent with sales, and are producing and selling above 50,000 cases/year.

Future of the Survey

Completion of the first annual Wine Industry Financial Survey is a turning point in the history of the California wine industry. However, one shapshot of the industry does not tell the full story.

Trend data based on multiple years of results should begin to provide increasingly meaningful analytical insights.

Table V – Segment Sales

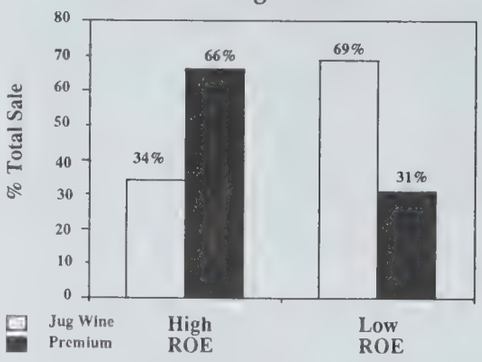
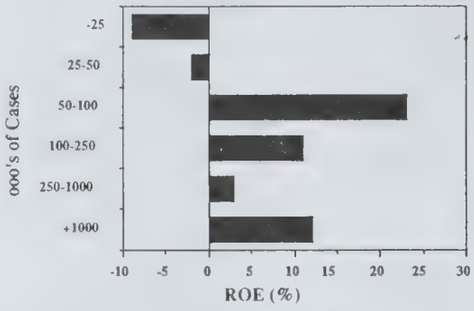


Table VI Scale Economies ROE by Winery Size



Touche Ross intends to continue to serve the industry with this survey, expanding the participant base and adding future years' results to the industry database.

All participating wineries in the survey receive a full report of the results and, perhaps more importantly, have access to the database for specific analyses. Confidentiality is a primary concern of Touche Ross. Therefore, all requests for database analyses are carefully reviewed to assure there is no potential for breach of confidential results.

It should be noted, for similar reasons of confidentiality, that Hambrecht & Quist does not have access to the database, nor to any winery specific data.

Touche Ross will be mailing a participants package with the 1988 questionnaire to all wineries in California, Oregon and Washington in February, 1989. Touche Ross requests that all questionnaires be returned by March 15, 1989 for inclusion in the 1988 results.

Winery owners and managers seeking additional information should write Gary Brayton at Touche Ross, One Maritime Plaza, San Francisco, CA 94111 or call 415/781-9570. ■

Gary Brayton is a management consulting partner in the San Francisco, CA office of Touche Ross. A Professional Manufacturing Engineer with over 18 years of food and beverage industry experience, he has a degree in Industrial Engineering, an MBA, and is the National Director of Touche Ross Winery Consulting Services.

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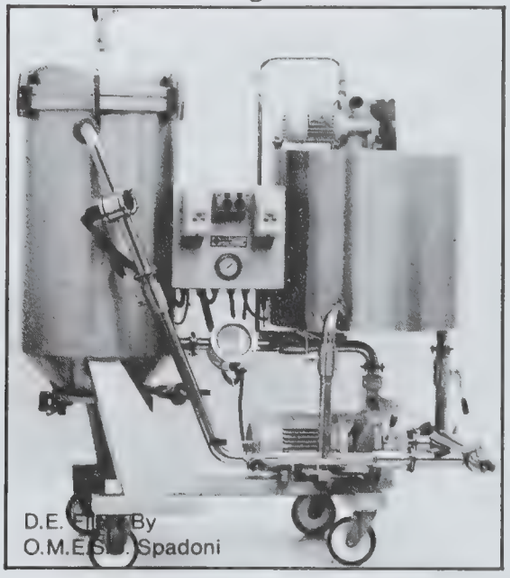

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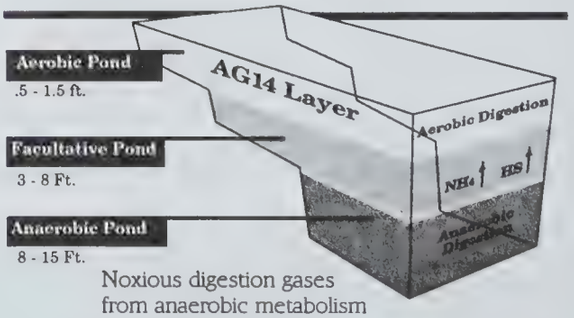

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CLIMATE and the VINE

Barbara Lindblom

Recently, there have been some re-evaluations of temperature summation and other means for evaluating climatic factors affecting vine development and growth, and must and wine composition. The following will present a different approach to addressing the weather actually encountered by the vine during its phenological stages.

As viticulturists and enologists in the 'New World' work together more seriously, and with increasing success, to affect wine quality from vineyard to bottle, they are considering employing practices which have evolved either experimentally or by tradition in other regions.

Whether employed in the next county or on a different continent, these practices express their effects as a function of many factors particular to individual sites.

The variables which determine a site's 'character' are numerous, complex, and interrelated. Climate is one of the most important of these variables. Therefore, meaningful climate data is of great importance. This information can contribute significantly to the prediction and explanation of results.

We have come to respect the importance of the specific site in the numerous viticultural treatment trials now in progress. We also have many immediate questions, such as:

Which variety should be planted in which location?

Which type of location should be sought out for a given variety or for a specific style of wine?

Which training or treatments are appropriate to each site?

Traditionally, climate in different regions has been evaluated in a chronological manner based on calendar months or days. For example, one can consider totals or averages of temperature spanning several months, often exclusively during the growing season.

One can even plot daily temperature levels on a curve (*i.e.*, a curve of the daily average temperature in any location from 1 January to 31 December, or from solstice to solstice.)

These values or curves can then be compared from one region to another.

In comparing regional climate data, and from observing the different nature of seasons in various regions of California and France, it is apparent that, from the standpoint of the vine, there is another possible way in which to evaluate climate data.

Vines are dormant for variable periods of time depending on the year and location. For example, the temperature in March in northern Sonoma County in California has a profound effect on the initial burst of growth after budbreak in this region. However, it is the temperature in April which carries the same importance for the vine in Burgundy, France, because budbreak occurs roughly four to six weeks later in Burgundy than in northern Sonoma County.

Another example of how climatic data can be interpreted is provided by analyzing the quantity of sunlight from veraison to harvest at a site, rather than by looking at monthly totals for either July or August. Many other examples come to mind: minimum/maximum daily temperature, rainfall, etc.

The following graphs are three-year averages of climate data. Therefore, they should not be taken as representative of the sites in question. They are used merely to demonstrate the approach of correlating climate data with phenological stage rather than with time.

Table I includes the average temperatures by month at the climate station at Maison Louis Latour in Aloxe-Corton, Burgundy and at the firestation in Healdsburg, Sonoma County, CA. Table II has the same data organized by reference to the respective times of budbreak in both locations—March temperatures in Healdsburg are superimposed over April temperatures in Aloxe-Corton. These are only approximations of bud break dates, but they illustrate the concept.

In the second table, it's much easier to see what weather the vines in Healdsburg and Aloxe-Corton are encountering at the same phenological stage, *i.e.*, the climate which the vine is actually experiencing.

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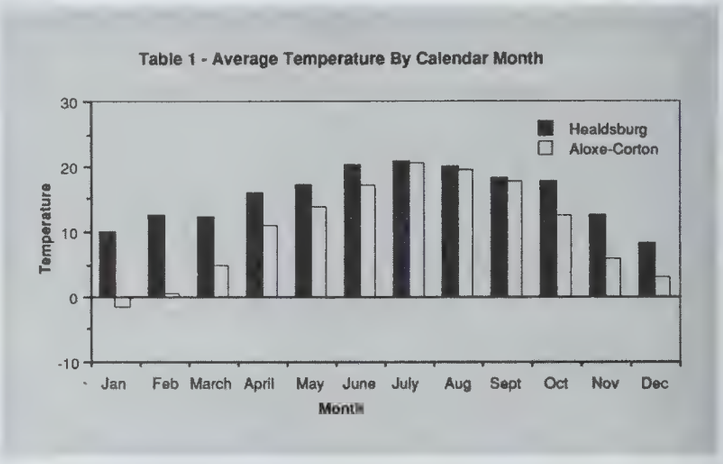
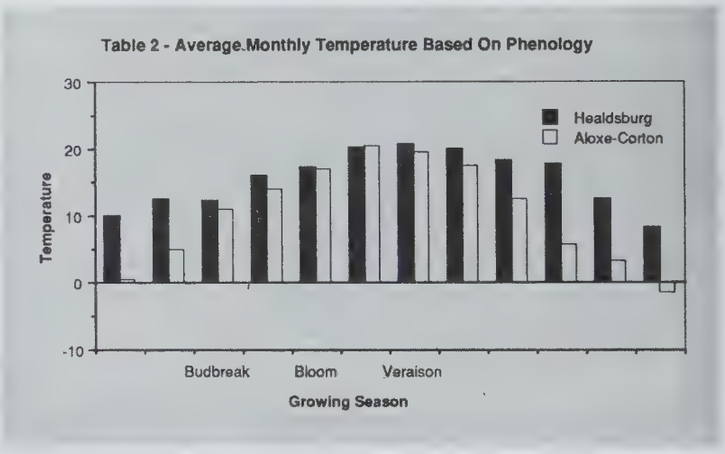
It can be seen that the greatest differences in temperature occur during dormancy, but one also notes the differences in temperature that occur between budbreak and bloom, which might explain the relative 'violence' or 'exuberance' of spring in Healdsburg compared to its rather reticent nature in Burgundy (where one waits for weeks for trees, as well as vines, to 'leaf-out').

This approach could also be used to compare rainfall, sunlight, minimum/maximum temperatures, etc., in relation to phenological stage rather than month. Other stages, such as bloom or a specific soluble solids at harvest for a particular variety, might be used as starting or ending dates.

By relating climate to phenology in vineyard trials, we may be able to better explain why specific variations generate the effects they do.

For example, if a certain practice advances or retards a given phenological stage, we can then look at the climate the plant will encounter (on the average) during various phases of its growth or development. (If we retard budbreak, most stages will be retarded; thus climate during bloom may very well be different—to our advantage or disadvantage.)





Such a tool, when analyzing or planning new practices, can help determine whether the first year (or first three years) of a practice is representative. It might also help us evaluate whether a neighbor's variety, clone, or practice is appropriate for us to try. (In this case, 'neighbor' is meant to encompass neighbors near and far.)

It should be noted that easy access to long-term averages is limited. Even at Domaine Louis Latour, where temperature, rainfall, sunlight and phenological data are tracked by month and plotted against 30-year averages, this data is in an easily assimilated form only for the months of April to September, though additional 'raw' data exists.

Conversely, it is difficult to obtain good information about average budbreak and other phenological data in Healdsburg.

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In any event, these graphs are not meant to be definitive comparisons of the two regions, but rather to show a different method of climate data organization.

Having looked at the potential use of aligning phenological stages and climate for a short time, and having been daunted by the work required to acquire climate data for various regions and varieties, it was delightful to discover the following announcement by Drs. Graeme McIntyre and Mark Kliewer of UC Davis. Hopefully, they will receive the response that will enable us to develop an easily accessible data bank, potentially so useful to us all.

Grapevine Phenology Data Assembly Project (PHENDATA)

There is a good deal of current interest in grapevine phenology, in California and elsewhere. In the past, limited data have often produced conflicting and inconclusive results in this area of study.

Only a large, consistent data base for many cultivars from many locations will enable the resolution of such matters as the actual base temperature for the calculation of degree-days, or the true order of development of all the commercially viable cultivars. With such a data base, it would also be possible to reliably match cultivars to local climates with a view to aiding site selection.

This project is designed to assemble a large phenology data base for grapevines in California. This data base is to contain phenology observations (budburst, flowering, veraison, maturity) for as many cultivars as possible throughout California, and also matching meterological data from sites as near the relevant vineyards as possible.

These data are to be stored on a floppy disk which is IBM PC compatible and is to be made available to any contributor, and to any researcher, for the cost of the disk and postage.

The project will be in two parts. First, past records kept by many individuals and companies of the dates of such development stages as mentioned above can be pooled. Where such data are not recorded, estimates can often be made from spraying dates, if recorded.

Such an amalgamation of data would be of mutual interest to all contributors, and would also permit analysis of the lateness or earliness of individual seasons in many parts of California.

Meterological data (such as rainfall, daily temperature, humidity, evaporation and sunshine) may or may not be available for individual sites. If not available, nearby official meterological data could be incorporated, with calculated adjustments.

The second part of this project is an ongoing one: to routinely collect the above data as each future season progresses, thereby developing and expanding the data base. The most efficient way to do this would probably be to use pro-forma post cards or forms which could be filled out and mailed at the end of each season.

Subsequent computer entry would routinely follow and annual analysis of each season would be carried out and returned to contributing individuals or companies and possibly released in a journal.

The primary aim of this project is the preparation of a computer-based research data set from which academic publications would emerge in due course. It is intended that these data become a semi-public document to be made available to anyone engaged in grapevine phenology and modeling studies. Details of ways and means of the data assembly would be made available at cost to all interested parties.

Anyone interested in participating in this project should contact Dr. Mark Kliewer or Dr. Graeme McIntyre at the Dept. of Viticulture & Enology, UC Davis, Davis, CA 95616. ■

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Symphony

How Many Wines from One Grape?

Glen Martin

New wineries continue to sprout like lupines in spring. Most produce and market the four varieties that have become vinous touchstones for the California wine industry: Cabernet Sauvignon, Pinot noir, Chardonnay, and Sauvignon blanc.

Of course, there are exceptions—specialists who carve out unique niches for themselves. Randall Graham's fascination with Rhone varieties has helped establish the reputation of his Bonny Doon Winery in Santa Cruz, CA, and Andrew Quady's ongoing love affair with dessert wines has made Quady Winery in Madera, CA, a commercial success.

Before Ken De Baun came along, however, no one had launched a winemaking venture based on a brand new grape variety.

I Smell a Symphony

De Baun's winery in Santa Rosa, CA, produces an array of wines from the Symphony grape, a cross between Muscat of Alexandria and Grey Grenache. Symphony was developed at UC Davis by Dr. Harold Olmo, who wanted to breed a vine that would produce substantial yields with no loss of fruit quality.

Olmo also wanted a wine that would be less bitter than Muscat of Alexandria, and one that could stand a bit of bottle age.

Mel Sanchietti inspects symphony grape vines trained on quadrilateral cordon.

He ended up with a grape that produces a white wine of far greater complexity and subtlety than he had anticipated.

When a panel of tasters described an early effort as possessing a 'symphony' of harmonious aromas and flavors, the new variety had found a name.

Olmo discovered that Symphony could be vinified in a wide variety of styles. Nonetheless, after he patented the grape in 1981, there was little interest in it until Ken De Baun tried a bottle.

In the late 1970s, De Baun acquired a large parcel of land south of the Russian River. After tasting Symphony, he decided to plant it on the property along with Pinot noir and Chardonnay. He sells fruit from the two Burgundian varieties. De Baun later acquired a 15-acre Gewurztraminer vineyard which he budded to Symphony in 1987.

De Baun's commitment to Symphony was not as impulsive as it may have seemed at first. De Baun thinks like a marketer, and he knew there was plenty of Cabernet Sauvignon, Pinot Noir and Chardonnay already on the market.

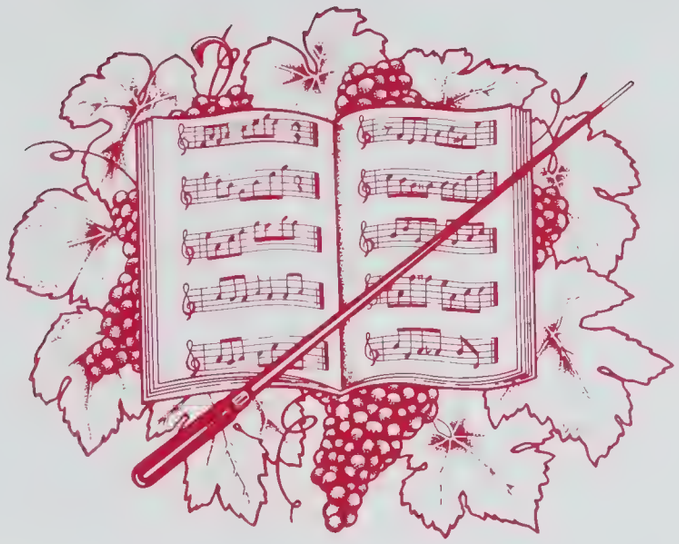
"I didn't know a hell of a lot about wine, but I knew enough about business to know that I didn't want to get involved in fighting for limited shelf space," he remarks. "I have an average palate, and I really like Symphony. I figured the average person would like it as well.

"I also liked the name. 'Symphony' sets us apart as something different. I knew we had to create our own niche to survive, and I figured the best way to do that was to concentrate on a grape nobody else was pushing."

Expert Help, Unorthodox Appeal

De Baun planted 18 acres of Symphony in 1982 and 24 acres in 1984 and contracted Korbel viticulturist Mel Sanchietti to manage the vineyard. Seven additional acres of rootstock were budded in 1987. Jamie Meves was hired as general manager and Roland Shackelford as winemaker. Meves is winemaker for Pat Paulsen Vineyards, and Shackleford has worked at Piper Sonoma, Domaine Michel, and Van Der Kamp.

"Our marketing strategy was two-fold," says Meves. "First, we wanted to play off the name. It's a name that sticks in the mind, that evokes associations of culture and gentility. We're aiming for the general market in an upscale kind of way. We're emphasizing product and package quality, but we're also striving to keep things accessible and unpretentious.

"The basic appeal of the wine from a sensory standpoint is its

Château De Baun

varietal character. It's fruity, but not simple. Varietal intensity is what we sell.

"Symphony can be handled in any number of ways in terms of vinification. We are currently selling seven products. 'Overture' is dry, with about 0.8% residual sugar. 'Prelude' has about 2.5% residual. 'Theme' has about 5.5%, and 'Finale', which is a late-harvest, unbotrysized wine, has about 12%. We also make a rose blend of Symphony, Chardonnay, and Pinot noir that we call 'Classical Jazz'. There are two champagnes—'Rhapsody', a sec rosé with an increment of Pinot Noir to add color; and 'Romance', a brut made entirely from Symphony."

Meves admits that such a product mix is highly unorthodox. "There's a reason for it, though," he maintains. "Our marketing is regional in its thrust. When you deal with only one grape, you can do that. We find, for instance, that 'Overture' does very well in California, where sophisticated palates tend to seek out dry wines, but in Atlanta, 'Prelude' sells like hotcakes.

"I'm not saying we'll always make five varieties of still wine—the marketplace will determine that—but people in different parts of the country like different wines. We intend to capitalize on that fact.

"We don't have to deal with preconceptions when we market Symphony. There are no experts on it. The people who are buying and drinking the wine are the experts, and we'll know what the best styles are for the grape by their patterns of purchase."

Cultivation and Vinification

Vinification strategy for all the bottlings begins in the vineyard. Winemaker Shackelford emphasizes the importance of having an experienced viticulturist like Sanchietti under contract. "We demand pristine fruit," he states. "If you have less than an immaculate vineyard, you could have trouble with Symphony. The vines are vegetative, and the clusters are large and tight. Mel really comes through for us. He exercises the kind of control we need."

Symphony is a prolific variety. It produces up to 20 tons/acre

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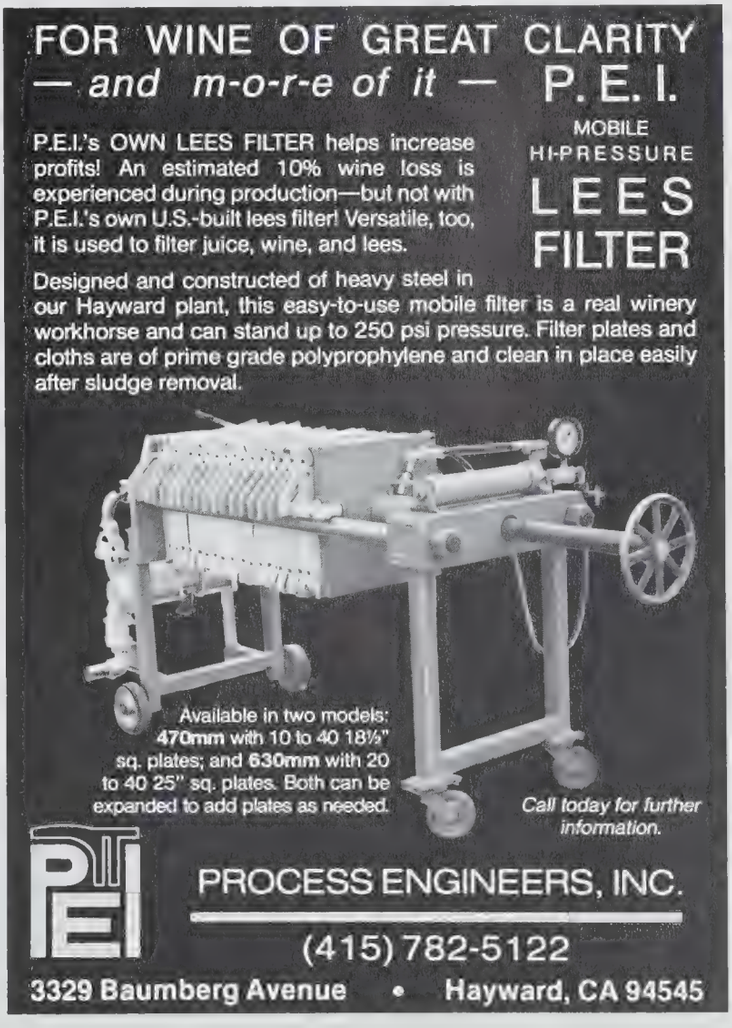
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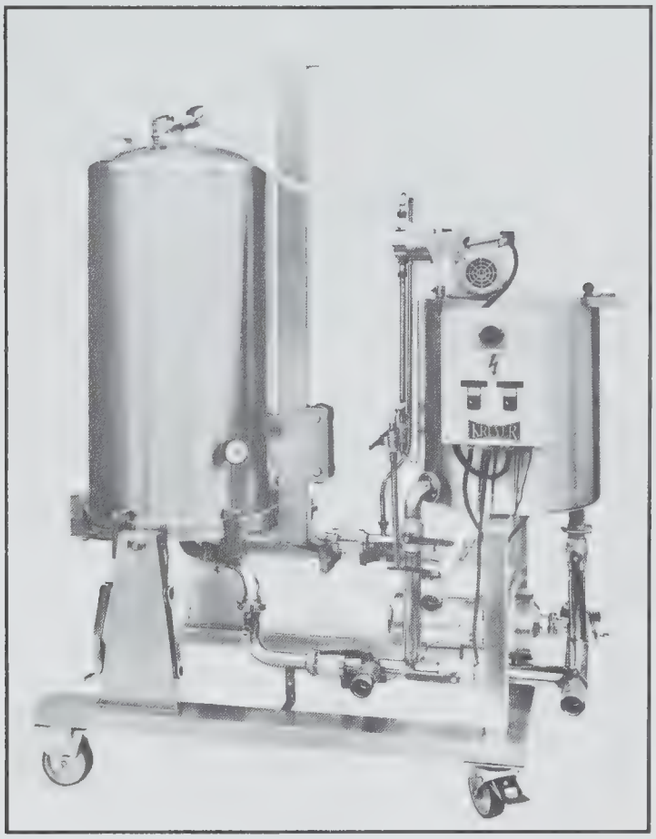

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in the San Joaquin Valley; 10 tons/acre in Sonoma County is not unusual. "We aim for under 10 tons, depending on the year," says Shackelford. "That means cluster thinning may be a part of our program. We also hedge fairly aggressively.

"We started with a 'V' trellis system on some of our vines, but the expense became excessive," explains Meves, "both in terms of installation and projected maintenance. We have switched over to quadrilateral cordons. The goal is the same—increased air circulation and sunlight exposure on the fruit—but our costs are substantially less.

"Like many growers, we feel direct sunlight can emphasize desirable varietal character and discourage vegetal qualities. Second crop is also removed if necessary."

Degree of residual sweetness is the main characteristic distinguishing the various Symphony bottlings produced by Chateau De Baun. Rather than ferment the wines to dryness, then adjust the sweetness with mute (sweet reserve), the grapes for each wine are picked at different sugar levels, and the fermentation of each is stopped to achieve the desired sugar level.

"First, we determine how many tons we'll need for each style," says Shackelford. "Then we pick at target sugar levels—whatever is most appropriate for each wine. That means we make several passes through the vineyard. Different areas are picked at different degrees of ripeness. Two or three weeks usually separate each picking."

The winery can process about 35 tons of fruit daily. Vineyard manager Sanchietti makes sure the grapes are delivered by 11 a.m. so that they will be as cool as Shackelford requires. The fruit is then gently directed into two conveyor-fed tank

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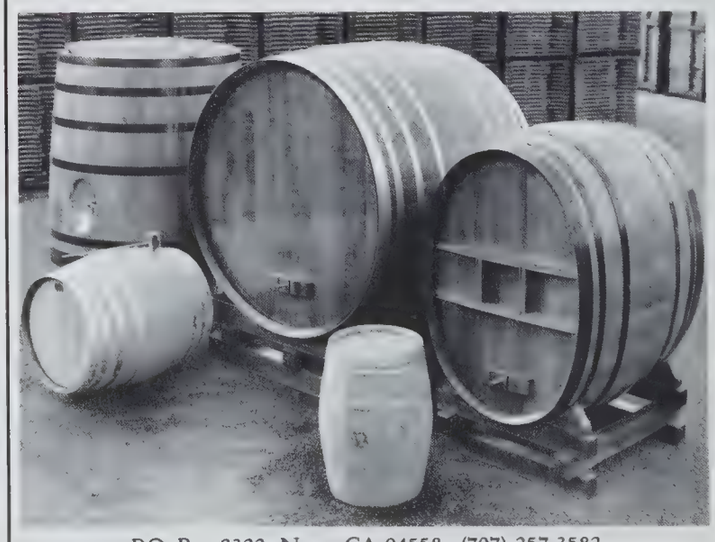

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Alcohol 12.0% by Volume • Sonoma County

presses. No crushing of the fruit minimizes skin contact.

"We do 100% whole cluster pressing because we want minimal phenolic extraction," Shackelford emphasizes. "You have to be very careful about that with grapes of Muscat ancestry." Juice yields average 160 gallons/tons.

For the two sparkling wines, the first 140 gallons from the press are kept separate. The remaining 20 gallons, lower in sugar and acid and higher in pigments and phenols, comprise the rebeche that is later blended into 'Overture'.

The juice is cold-settled and the heavy juice lees are filtered. The juice is warmed to about 60°F prior to innoculation with Prise de Mousse active-dry yeast. Once a vigorous fermentation has begun, the temperature is lowered to between 45° and 50°F. Fermentation takes between 15 and 20 days.

Shackelford checks each fermentation tank daily. Rather than predetermine a sugar level for each wine, he decides based on sensory perception. "It all depends on how it tastes," he says. He stops fermentation by reducing the temperature and adding 40 ppm SO_2.

"We don't add SO_2 prior to fermentation. We want all the browning phenols to adhere to the yeast and settle out. Luckily, we don't have much trouble with browning with Symphony."

After the SO_2 addition, the wine is given a light D.E. filtration and is cold-stabilized. Heat stabilization is achieved with a bentonite addition. A second D.E. filtration and another SO_2 addition of 20 ppm occurs prior to bottling.

Chateau De Baun's two sparkling wines are vinified according to classic méthode champenoise techniques. They are identical cuvees, except that Shackelford uses a French method for the 'Rhapsody' bottling that he has not seen widely employed in California.

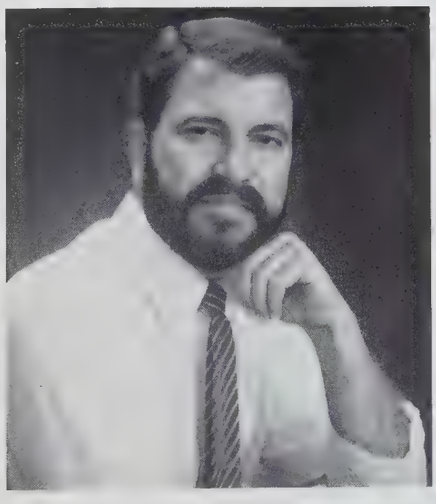
"We use Pinot noir in the dosage rather than fermenting Pinot noir juice," he reveals. "That way, we mostly avoid the orange cast you see in so many Blancs de Noirs. Instead, we get a very vibrant, purer rose color." Another result is that 'Rhapsody' is slightly sweeter than 'Romance'.

The Future

Production at Chateau De Baun currently is about 15,000 cases/year. Meves and Shackelford expect it to climb to around 50,000 cases in several years. Though production is now carried out in a warehouse in a Santa Rosa industrial park, Ken De Baun has ambitious plans to build a winery and visitor's center on the vineyard property. "We're in this for the long haul," he says. "Our commitment is firm."

Response to Symphony has been good and the wines have received a substantial amount of flattering press. Yet the De Baun management team acknowledges that consumer education remains their number one priority. "We have to tell people not only who we are, but what the essence of the product is," says Meves.

"All of us are on the road a lot, and Greg Ostermann has been hired as national sales director to share some of the load. Luckily, we've found that Symphony mostly sells itself. They're easy wines to like. We just have to do two things—get the wines out there for people to taste and maintain strict quality control. We're satisfied that we're doing both." ■



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Bulk Wine Market Serves Large & Small

Stan Hock

Although economic constraints may limit their involvement, small wineries can benefit as much as large ones from participation in the bulk wine market. Brokers of bulk wine handle quantities ranging from a few barrels to hundreds of thousands of gallons.

Why Bulk Wine?

There are many reasons why wineries buy and/or sell wine in bulk. The most basic is that it affords them a degree of flexibility in responding to fluctuations in grape supply and consumer demand.

"In addition," adds Karen Mancuso of Vintners Edge, a broker serving large and small California wineries, "grapegrowers who have not contracted all of their grapes have the alternative of participating in the bulk wine market. Brokers can help find a home for the grapes or arrange custom processing and eventual sale of the wine."

"Wherever there is an established wine business, there are two problems," says Bill Turrentine, of Turrentine Wine Brokerage, a California broker of premium wine in bulk. "There is the problem presented by Mother Nature, which each year gives us variations in volume and style, and there is the problem presented by fickle consumers, who frequently change their minds about what they want.

"Between Mother Nature and the fickle consumer, the wine producer is almost always out of balance with the market. So there is always a need for an adjustment.

"I think the term 'bulk wine' is somewhat unfortunate, because it connotes cheap wine or poor wine, and that isn't necessarily the case. A bulk wine is simply a wine that is not sold in the bottle, and it can be of extremely high quality."

Wineries sell wine in bulk because they have a surplus (due to a bountiful harvest or an unsuccessful marketing plan), are in need of cash, or want to dispose of a wine that does not fit stylistically into their program.

"Conversely," says Patricia Schweizer of Vintners Edge, "buyers are short of a desired wine. This short position can result from a less than normal harvest, from sales increasing more rapidly than projected, or from the inauguration or carrying forward of a private label or second label program. Or they may have speculative funds available, or be attempting to maintain a certain style with a wine. Buyers may also use the bulk wine market to moderate the cost and resulting bottle price of a wine."

Large wineries routinely buy and sell wine in bulk. It is a means of maximizing production without having to invest in capital-intensive physical expansion, expansion which invariably results in higher bottle prices and a threat to market share.

Smaller wineries, on the other hand, particularly those in the super-premium end of the market, tend to buy wine in bulk to fulfill a specific, transitory need—they are short of a staple wine or are striving to maintain consistency of style with one of their trademark varieties.

For example, if a small winery has developed a reputation for producing a Cabernet Sauvignon that is soft and supple upon release, it may face a serious marketing problem should a particular vintage yield a tougher, more tannic wine. Blending with a softer Cabernet Sauvignon or Merlot purchased on the bulk market may help solve the problem.

BATF labeling regulations allow premium wine producers a measure of flexibility in blending to achieve consistency of style, appellation, and product cost. A varietal designation requires only that 75% of the wine be produced from the grape type indicated on the label.

The use of political appellations (*i.e.*, Sonoma County, Napa County) similarly requires only that 75% of the wine come from the area listed. Viticultural appellations (*i.e.*, Carneros, Alexander Valley) require 85% truth-in-labeling; a vintage date or estate-bottled designation, 95%.

How Does it Work?

Most bulk wine transactions are facilitated by brokers who specialize in the 'matching' of sellers and buyers. The broker represents the interests of both parties and acts as an intermediary in the negotiation of a sales agreement specifying variety, vintage, quantity, appellation, price, shipment date, and payment terms. The broker also insures the confidentiality of the transaction.

In helping would-be buyers locate wine on the bulk market, a broker first determines what a winery's needs and priorities are in terms of variety, vintage, volume, appellation, and price.

Purchases are based on samples of fresh wine supplied by the seller, via the broker, to prospective buyers. The entire lot of wine to be sold must conform to the samples provided.

"Price is based on many factors," says Schweizer. "It is always subject to negotiations mediated by the broker. Prime considerations include the amount invested in the wine by the selling winery; the wine's appellation, vintage and intrinsic quality; and prevailing market conditions."

"There is no reliable science to pricing a bulk wine," notes Turrentine. "It really depends on the needs of potential buyers. For some, price is of paramount importance; for others, price is not the first consideration. Basically, competition for the wine writes the ticket."

For the past several years, for example, good-quality California Chardonnay and Cabernet Sauvignon have been in great demand and limited supply on the bulk market. Thus, prices have been very high: 1987 north coast Chardonnay has been selling for between $9.00 and $14.00 per gallon.

Prices can also fluctuate rapidly and

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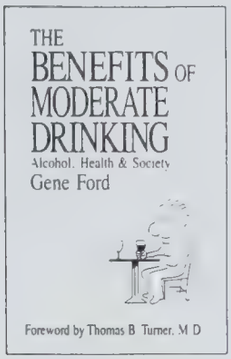

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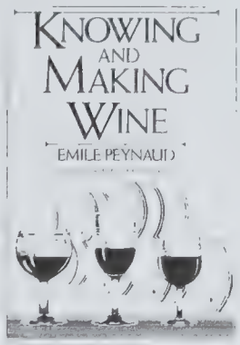

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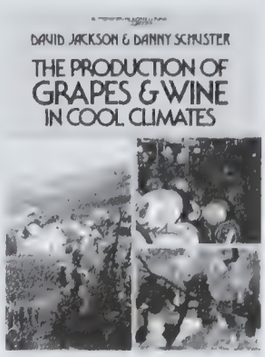

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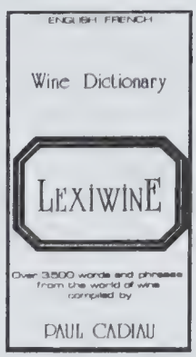

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dramatically, as evidenced by white Zinfandel bulk wine. "White Zinfandel has gone absolutely crazy," Turrentine says in amazement. "Retail prices will have to increase in the near future. Zinfandel grapes in the Lodi area (traditionally a source of inexpensive Zinfandel grapes) sold for $1,000/ton in 1988."

Bulk wine sales normally are F.O.B. the winery—*i.e.*, the buyer pays the shipping charges. Thus, the smaller the lot of wine purchased, the more expensive transportation costs are on a per gallon basis, depending on distance shipped. Purchase quantities can be as small as 100 gallons, and 1,000 to 3,000 gallon lots are commonplace. A full two-trailer truckload is 6,200 to 6,800 gallons.

"Payment terms are negotiated between the seller and buyer," says Schweizer, "through the broker. They vary according to the size and value of the shipment, the quality of the wine, the cash needs of the seller, and the credit history of the buyer. If a wine is in strong demand, the seller may demand a non-refundable cash deposit prior to shipment, with the balance payable in 30 or 60 days. If the buyer's credit history is spotty, the seller may demand 100% cash payment."

"In the current seller's market, payment terms are short," notes Turrentine, "and this can be difficult for wineries that don't have financial resources, because when there's competition for a wine, an offer of cash upfront can be the decisive factor for a seller. Terms are always more flexible in a buyer's market."

A Business Decision

In the bulk wine market, wine is treated as a commodity to be bought and sold. As in other commodity markets, timing is critical to success. Sellers strive to sell their unneeded wines when the market is strongest for them (as it is now with Chardonnay, Cabernet Sauvignon, and white Zinfandel). Buyers hope to acquire what they need without paying a premium.

"Of course," observes Schweizer, "wineries cannot always time their sales or purchases to coincide with advantageous swings of the market. Short-term cash requirements and rapidly changing sales projections may dictate an initiative in the bulk wine market that later appears unwise. It is not unusual for a winery to sell a quantity of wine prematurely, only to wind up having to purchase more of the same variety, perhaps at a higher price, six months later."

In fact, it is the cyclical nature of the wine industry that is the single most influential factor determining the character of the bulk wine market at any point in time.

"It's a very cyclical business," states Turrentine, "and there are three distinct factors in the cycles. Most important is production. Shortages produce high prices, which leads growers to plant, which in time increases production, which depresses prices. Then you have to factor in the relative strength or weakness of the dollar and changing consumer demand."

The cyclical nature of the wine—and thus, bulk wine—business requires that wineries, to the extent possible, base their buying or selling decisions upon sound business planning, which requires a continuous monitoring both of winery cash flow, inventory, and sales projections, and current and projected market conditions.

Such calculations are fluid and often complex, and buying and selling decisions will always involve a bit of 'guestimation'. However, for those wineries, both large and small, which participate wisely in the bulk wine market, the benefits can be great. ■

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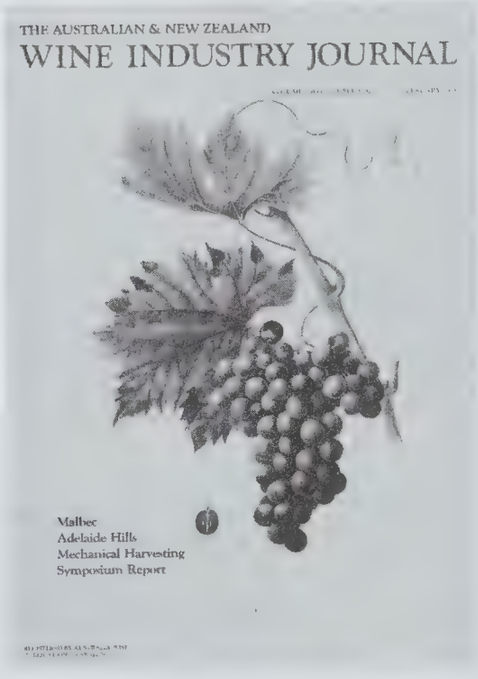

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Factors Affecting

Vine Survival in Winter

G. Stanley Howell
Dept. of Horticulture
Michigan State University

This paper originally appeared in the "Proceedings of the Second International Symposium for Cool Climate Viticulture and Oenology," January 1988 and has been edited with the author's cooperation.

Cold hardiness in grapevines is not attributable to a single physiological or biochemical entity. Rather, it is a diverse collection of vine characteristics and environmental stimuli (or cues) that interact at any given moment to create a particular level of cold resistance.

It is important to note that the expression of genes for hardiness is influenced by the environment in which a vine is growing. The environment to which grapevines are exposed during the dormant season varies by site.

Tissue, organ, and even vine survival depends upon this interaction of the dormant season environment (primarily temperature) and the genetically controlled response of the vine to that environment (changes at various levels of cell or tissue organization).

Dormant Season Changes in Vine Cold Hardiness

It is convenient to subdivide the dormant season into smaller units of time, based on their individual importance and the likelihood that different vine mechanisms and/or combinations of mechanisms are prevalent during each period.

The first period of the dormant season is called 'acclimation'. It is a time of transition from the non-hardy to the hardy condition. The second period is called 'mid-winter', when both severe cold and maximum vine hardiness coincide.

The third period occurs after cold weather has satisfied the vine's internal need for physiological rest. In this 'post-rest' period, vines are more responsive to periodic temperature fluctuations than during the rest period. The result is a greater amount of fluctuation in vine cold hardiness in the post-rest period.[20]

The third period continues until gradual warming begins and vine deacclimation commences. The final period of interest coincides with a window of susceptibility to spring freeze damage, based on the probability of a spring freeze (30°F or colder) occurring after budburst.

Commercial viticulture exists in a wide range of climatic zones. In the areas of the northern temperate zone, choice of site (mesoclimate) is a critical factor influencing exposure of vines to severe cold. Hardy cultivars such as Concord are successfully grown on sites which are exposed to -20°F on the average of once every three years.

In continental climatic zones (areas remote from large bodies of water, which serve to ameliorate temperature extremes), thermal air inversions can reduce freeze hazard in hill or mountain sites.

Less hardy cultivars must be planted on better sites close to a body of water, such as one of the Great Lakes, in order to take advantage of the water's moderating influence on temperature. Cold-tender cultivars (all *V. vinifera* and some hybrid direct producers) must be grown on the best sites within a few miles of deep-water lakes. Such superior sites generally see temperatures below -20°C only once a decade.

Evaluating the quality of a site based on mid-winter criteria is an approach followed by all viticulturists. However, damage to grapevines can occur anytime during the dormant season. In a sense, we can think of hardiness as a moving target during the dormant season. The hazard depends upon the level of tissue hardiness and the minimum temperature to which the tissue is exposed.

We can evaluate the hazard by comparing a temperature minima curve over the entire dormant season and superimposing hardiness levels for individual dates on the curve. In this manner, we may answer the crucial question often asked by grape growers: at what part of the dormant season is the cold temperature-vine hardiness relationship in closest proximity?

Answering this question is a prerequisite to cultural manipulation of vine cold hardiness, and answers will likely vary depending on cultivar, site, and macroclimate (continental vs. maritime).

Carbohydrates

When a thaw occurs in mid-winter it is commonly followed by a rapid return to normal, very cold temperatures. The hardy vine dehardens in response to the thaw and rehardens in response to the return of cold. This rehardening requires energy and that is the basis for our concern about carbohydrate levels in the tissue.

Carbohydrates are the energy-producing compounds that most commonly drive the metabolic machinery of the vine. They are produced by photosynthesis in green leaves and may be channeled to meet any of the vine's needs, such as fruit maturation.

In vines and other plants, we use the terms 'source' and 'sink' to refer to leaves which are the 'source' of carbohydrates produced during photosynthesis, and to fruits, growing shoots and roots, cam-

Table 1. Cultural manipulations or decisions which influence the likelihood of freeze damage.

Cultural Manipulation	Possible mechanism
Preplant	
Site selection	Influences degree of exposure to stress[8,41,46]
Cultivar selection	Genetic capacity for cold hardiness; differences in budburst timing[8,42,7,16,25,26,2,39]
Rootstock selection	Influences nutrition, H_20, and growth regulators directly; vine vigor, capacity indirectly; influences budburst[9,34,35,13,38] Of the grafted vines tested to date, scions grafted to C.3309 have shown a small, but consistently greater level of cold hardiness than those grafted to other rootstocks.[35] Similarly, C.3309 is more cold-hardy in its own vegetative tissues—a matter of importance in cold climate areas[34]
Canopy Management	
Trellis selection	Influences vine structure and subsequent leaf position/ shoot orientation, sunlight receptor or shade = increased vs decreased carbohydrate production[45,16,15]
Shoot positioning	Influences light penetration into canopy[16]
Leaf loss	Reduced light receptors for net photosynthesis[16,17,32]
Crop Control	
Pruning severity	Limits fruit competition for carbohydrates; necessary for both ripening and hardiness[45,6,18,15]
Flower cluster thinning	Reduces fruit competition for carbohydrates[18,15]
Vine size	Related to fruiting in balanced pruning and to internal canopy shading; both create competition for carbohydrates[16,15]
Pruning	
Pruning severity	(see above)
Delayed pruning	Pruning stimulates growth dehardening; delay gets one past critical period, allows adjustment of bud number if damage occurs[10,21,50]
Long cane pruning	Apical buds on a cane suppress bud burst at basal nodes; remove excess bud number after budburst[21]
Double pruning	Leave excess canes until after budburst; remove any excess then[42]
Double trunks	Severe winter freeze will not cause equal damage to both trunks, since they often vary in hardiness. Older or younger trunks may be hardier depending on the type of freeze[8]
Cane selection	Mature canes with dark periderm have higher carbohydrates and greater cold hardiness; large diameter canes indicate excess indicate

bium and storage in vegetative tissues as 'sinks' where carbohydrates are used.

Toward the end of the growing season, however, carbohydrates must also be accumulated in the canes, trunks, and roots of the vine (*i.e.*, sink shifts must occur) to ensure successful wintering of the vine. The first flushes of vegetative growth must also be driven by this carbohydrate reserve until the canopy is reestablished and becomes a net carbohydrate exporter to the rest of the vine.

Table 1 lists a variety of vineyard practices which can influence carbohydrate status. In general, those practices which enhance net photosynthesis also enhance tissue cold hardiness. Conversely, practices which reduce the vines' ability to produce and/or store carbohydrates can be expected to reduce vine cold hardiness.

In viticultural areas where winter survival is problematic, it is important to understand that vine hardiness is one of several sinks affecting carbohydrate partitioning. The demands of the vegetative growth (early in the season) and the developing fruit (later in the season), relative to root growth and other needs, are reasonably well-understood[12].

Table 2 puts these source/sink relationships into perspective for cold hardiness. A series of defoliation treatments applied at veraison were compared and expressed in terms of their effect on fruit sugar accumulation, fruitfulness, and bud mortality.[32]

These data suggest that the low carbohydrate levels available to the various

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Cultural Manipulation	Possible mechanism
	excess vigor and are less hardy, as are canes with persistent laterals[16,22,51,52,53]
Spare parts	Vine canes and spurs at or just above the graft union and in excess of need are retained as 'spare parts' in case of severe winter damage[37,38]
Vineyard Floor Management	
Nutrition	Soil nutrients are necessary for growth and development; deficiencies yield reduced hardiness; excess, particularly N, may delay maturation, reduce carbohydrate accumulation; some controversy over K—excess induces magnesium deficiency[28,49,36]
Water	Necessary for growth and Pn; late in season may delay maturity and carbohydrate accumulation; roots are a factor in reducing tissue moisture—important in acclimation and deacclimation[41,31,30,50,51,52,53,54]
Weed control	Reduces competition for nutrients and H_20 early in season when vine is developing current season's canopy; weeds may be beneficial after veraison for same reason[11,6]
Cover crops	Compete for nutrients, H_20 at and after veraison; result is hastening of vine maturation[11]
Sod culture	Can be beneficial in cold climates where root survival is a concern; soil tillage can influence soil moisture and the ability of the soil to absorb heat during the day, *i.e.* bare soils absorb (and thus release) more heat.[4,48]
Maintain Foliage	
Insect and disease control	Leaf condition influences Pn and subsequent carbohydrate status[17,32]
minimize mechanical damage at harvest	Damage to leaves by organisms or environmental agents negatively influences vine hardiness
Avoidance	
Winter protection	Common methods of preventing vine exposure to ambient temperatures—some active, most passive (covering in some form)[47]
Spring Bud Phenology	
Cultivar	Genetic differences in threshold for onset of growth[2,26]
Cane length	Apical buds on cane suppress basal budburst[43,21]
Development stages	As development advances, buds are less tolerant of spring freeze[25]
Applied growth regulators	Applied chemicals which reduce vegetative vigor may improve maturation and hardiness but tests to date have often been inconsistent[14,1]

sinks had the least effect on the fruit sink, a more negative effect on the differentiation of buds for the next season's crop (bud fruitfulness), and the greatest negative effect on bud hardiness.

The implications of differing sink strength are important. Carbohydrates are necessary to provide the energy re-

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Table 2. The influences of varying levels of carbohydrate stress created by different defoliation treatments at veraison on sugar accumulation, fruitfulness (grams of fruit/node retained), and bud mortality, expressed as changes in percent of the control.

Treatment	% Brix	% Fruitfuless	% Bud Mortality
Control (F)	0	0	0
Cordon (F)	+ 4	-12	+ 102
Shoot (F)	- 2	- 6	+ 76
Leaf (F)	- 8	-12	+ 18
Leaf (D)	- 6	-14	+ 23
Shoot (D)	-10	-11	+ 125
Cordon (D)	-30	-43	+ 527
Control (D)	-66	-91	+1239

F = foliated D = defoliated

quired for hardiness genes to be fully expressed. The data suggest that carbohydrate production and distribution in the vine must be superior to that required for maximum fruit maturity and to sustain optimum production the following season, if maximum hardiness is to be achieved.

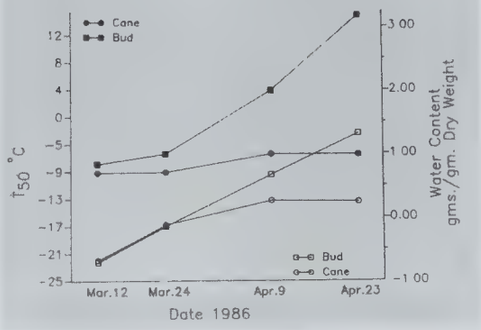
Water

It is almost axiomatic that increasing water content of a hardy tissue, such as bud, cane, and trunk tissues, will reduce the cold resistance of that tissue.[27,3] In recent work[50,51,53] we have learned that vine water content reduction is a primary change that occurs during acclimation of primary buds and canes.

This internal reduction in tissue moisture level is under vine control primarily via a reduction in vine conductivity of water by the roots. This should not be interpreted as a practical means to enhance vine hardiness by withholding water in the fall. Such an approach could be a disaster in locations where vines are irrigated. Adequate soil moisture is a crucial necessity to help hold soil temperatures at safe levels since water has a greater heat capacity than does dry soil.

Changes in the conductivity of water by roots also occur[54] and this change is similar to the response observed in dogwood (Cornus spp.) roots[31]. Recent unpublished research in our laboratory has demonstrated a similar, though reverse, response in Seyval vines deacclimating prior to onset of budburst (Fig. 1).

Fig. 1. Change in cold hardiness of Seyval buds and canes as related to tissue water content.



For many years, we have been aware of a translocatable, hardiness-promoting factor that occurs in leaves during the shortening days of winter.[23,19] Recent work by Markhart[30] with abscisic acid (ABA) may provide a clue to this phenomenon. ABA is a naturally occuring plant 'hormone'. There appears to be species or varietal differences in the response of grapevines to the photoperiod (length of day).

ABA reduces root conductivity of water. The period of influence of the translocated factor (until the first hard frost) coincides with the period marked by the relation of dehydration to tissue hardiness. Further critical work is required to determine whether this hypothesis has merit or is simply interesting speculation based on a correlation of phenomena.

Spring Freeze Damage

The final opportunity for freeze damage to grapevines (or the first, depending on your situation) occurs in the period between the onset of bud growth and the last probable exposure to 30°F during spring. Many viticultural areas with a mild dormant season can suffer severe economic losses due to spring freeze damage.

One review of this subject[24] listed a number of factors which can affect spring freeze damage (Table 3). The stages of bud development (phenology) seems to be of paramount importance.[24,25] Critical temperature (the temperature at which bud mortality occurs) becomes warmer as buds swell and break in the Spring.[25]

Understanding critical temperature is crucial to intelligent use of spring freeze protection techniques such as vineyard heating, wind machines, and irrigation.

Species and cultivar can influence spring freeze damage through genetic influence on both the time of bud break and susceptibility to critical temperatures[26]. For example, varieties that break bud early, such as Cabernet Franc or Chardonnay, should definitely not be planted in frost-prone sites.

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Table 3. Factors influencing spring freeze damage

Bud phenology	Species and cultivar
Freeze duration	Relative humidity
Wind	Freeze type
Pre-freeze temperature	Soil moisture
Rainfall prior to freeze	Ice nucleating bacteria

Cabernet Sauvignon might have a margin of safety in those frosty sites. One should be careful to consider timing of onset of bud burst in choosing varieties for planting on marginal sites.

Duration of exposure to a freezing temperature may be important since bud tissues are protected from freezing by supercooling. Supercooling is an avoidance mechanism by which the freezing of water in bud primordial tissues is deferred to lower temperatures.

By contrast, cane, cordon, trunk, and root tissues prevent the lethal consequences of freezing temperatures because ice does form in the tissue, but outside the cells. This extracellular ice then influences the amount of free water in the cell and thus reduces the chance that the cell will freeze. This is an important difference between bud hardiness and vegetative tissue hardiness.

Dewpoint (relative humidity) can also be a factor in spring freeze damage. If the humidity is high, the type of frost produced is a white or hoar frost; low humidity results in a black frost. Black frosts require colder temperatures than do white frosts because surface ice on the buds can nucleate the buds via ice entry through access such as stomates, lenticels, and wounds.[5]

Conditions prior to spring freeze episodes can also affect the degree of damage. Buds exposed to warm, dehardening temperatures commonly are more damaged by freeze episodes than are similar buds under non-dehardening conditions. For spring freezes, however, this effect is often confounded by changes in bud phenology status.

It's important to note that exposure to cold, 'acclimating' temperatures yields no improvement in hardiness. This inability to regain hardiness is characteristic of rapidly growing tissues. Prior to the onset of growth, the opportunity for a rehardening response would exist.

In the last decade, considerable work has been done on bacteria capable of initiating ice nucleation (water freezing) in plant tissue.[29] For such bacteria to have an influence on supercooling, and therefore on critical temperatures affecting developing grape buds, two conditions must coincide: 1) populations of the bacteria *Pseudomonas syringae* on the tissue must exceed 10,000/cm and 2) this must occur during the period when bud tissues are susceptible (onset of growth) to spring freeze episodes.

Duration of this period (window of susceptibility) varies by viticultural area. In Michigan, it is about three to four weeks. Equally important is the fact that cold weather preceding this window of susceptibility does not often produce nucleation-active bacteria populations in Michigan (Jones, personal communication, 1986).

So, if either the population is inadequate to produce a nucleation event or if the probability of a spring freeze episode has passed, there can be no frost hazard. In macroclimates of different characteristics from the Great Lakes region, the twin themes of bacterial population and probability of a spring freeze must be carefully considered before applying expensive protection measures to reduce or eliminate the bacteria.

The utility of any cultural manipulation must be viewed from many perspectives. First, it must be considered from an economic perspective. It must be based on the impact of the practice on vine cold hardiness at those times when such hardiness is limited. It must be viewed from a physiological or genetic perspective, so that the process is understandable and leads to specific vine improvements.

It must also be viewed from a viticultural standpoint, to ensure that ideas gleaned from laboratory research or other controlled conditions are translatable in the vineyard.

I was once confronted by a gentleman who demanded that I explain why we could put a man on the moon, but could not solve the problem of winter damage to his White Riesling vines. I explained that the technology existed, but that greenhouses were expensive. Viticulture, unlike NASA in the 1960's, does not operate on a cost plus profit basis.

Conclusion

One characteristic of viticulture in cool climates is the likelihood of vine damage from temperatures below 30°F. Damage may occur to vines that have not properly acclimated in the autumn; it may occur when weather patterns convey severe cold from polar regions; it may occur when a period of warm 'thaw' during dehardening is followed by a sharp return to winter-like temperatures; or it may occur after growth has

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begun and a spring freeze causes loss of shoots/buds.

Factors favoring sunlight penetration of the grapevine canopy, including small vine size, shoot positioning, and training system, influence tissue hardiness favorably. As noted above, optimum light conditions are desirable for photosynthesis and maximum carbohydrate production, and thus for maximum tissue and vine cold hardiness. This is especially true of sites that are perhaps marginal for commercial viticulture. ■

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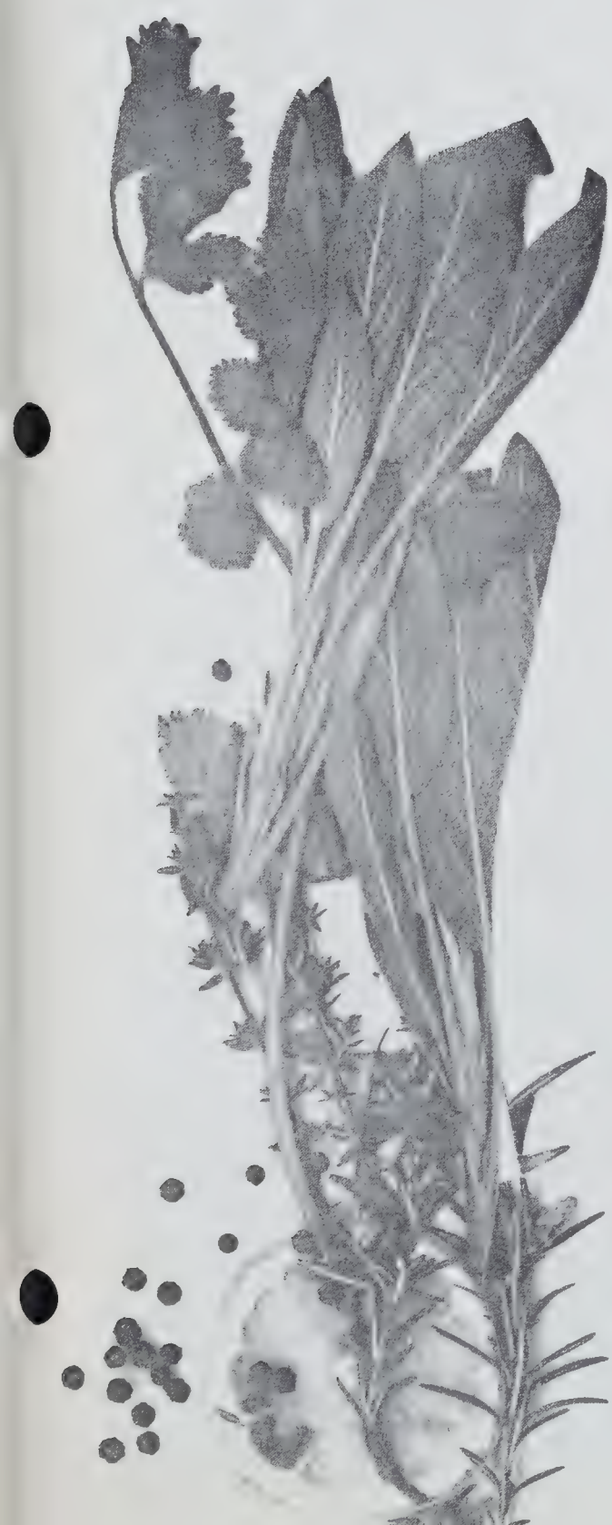
PART II

Matching Seasonings and Wines



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"God loves fermentation just as dearly as he loves vegetation."

Ralph Waldo Emerson

PWV: ***What guidelines do you recommend in matching wines to flavoring ingredients such as herbs and spices?***

KK: In matching wines to foods we recommend seasonings that link the food to the wine. We call seasonings 'the ties that bind'. These seasonings may be an herb or spice combination or another food that contributes flavor, such as tomato or garlic.

We also consider the method of cooking as a seasoning, since grilling, roasting and smoking contribute their own unique flavors. ***In our view, the choice of seasoning is more important to the wine than the food itself.***

We begin by balancing the strength of flavor in both the food and the wine. A general guideline is that the *stronger* the wine's flavor, the stronger the flavors of the food and its seasonings should be.

For example, experience has taught us that a rich, flavorful Chardonnay is enhanced by foods seasoned with sage and cracked pepper; a robust, complex Syrah is complemented by foods seasoned with rosemary and garlic. Again, stronger wines go with stronger seasonings.

Conversely, more delicate styles of wine should be paired with foods that have more delicate textures and are seasoned with more subtle flavorings.

For example, a delicate Chardonnay, Fume Blanc or Chenin Blanc can be successfully paired with the delicate textures of fish, chicken or pounded veal seasoned with parsley, chervil, dill, or the citrus/ginger nuances of lemon thyme. Strong seasonings such as sage, rosemary, or garlic, used at full strength, would overpower a subtle, delicate wine and interfere with its true enjoyment.

A coarse or spicy wine may be enhanced by foods that are either spicy or bland; the first increases the overall spiciness of the wine and food; the latter diminishes it.

For example, Sauvignon Blanc, Gewurtztraminer, Petite Sirah, Zinfandel and Pinot Noir are varietals that have an inherent spiciness—only the degree varies. We like seasoning foods with mustard or ginger when serving them with these wines, taking care to match the strength of the wine's flavor and spiciness to the strength of the seasoning.

Allspice, cinnamon, clove and nutmeg are other 'spicy' seasonings that work well with these wines. (An exception perhaps would be a dry Fume Blanc.) All these spices tend to enhance the inherent spiciness of the afore mentioned varietals. The same foods not flavored with these zesty seasonings would tend to diminish the spicy impression of the wine and serve as a counterpoint.

PWV: ***How do you select foods or seasonings to best complement dry wines?***

KK: Dry wines are usually enhanced by foods that are ***not*** sweetened by the addition of sugar; foods that ***are*** sweeter tend to make dry wines taste sour.

Consider a dry Fume Blanc served with chicken in a butter cream sauce seasoned with a touch of curry and lemon thyme—nothing sweet and a perfect complement. That same wine served with chicken breast in a salad of sweet tropical fruits and a dressing of mayonnaise sweetened with honey and orange would most certainly make the wine taste sour.

Dry wines are best complemented by herbs rather than sweet spices. Nuts that are not sweet, such as almonds, pistachios and pecans (but not cashews), can be used successfully. We've found that a careful combination of one or two herbs and a spice with a hot compound can be very effective with dry wines.

An example of the latter would be mint and tarragon leaves crushed with green peppercorns and rubbed into red meat or game as a dry marinade. Whether grilled, roasted or smoked, it would serve as the perfect complement to most Cabernet Sauvignons or Zinfandels, depending on the wine's style and strength of flavor.

These red wines rarely have any residual grape sugar, their perceived sweetness comes from their berry-like flavors, which can be enhanced by the sweet herb/hot spice combination.

PWV: ***What about sweeter wines?***

KK: Some wines with full fruit flavors are often perceived as 'sweet' when they are not. What we are talking about here are wines where the grape's natural sugar has not been entirely converted to alcohol during fermentation. In table wines, the residual sugar level is usually below 4% and in dessert wines between 8 and 12% R.S. One can be fooled because a higher level of acidity can reduce the perception of real sweetness in wine.

We try to balance the degree of sweetness in the wine with the level of sweetness in the foods and seasonings. Wines made in a sweeter style, like some White Zinfandels, Sauvignon Blancs, Chenin Blancs, Rieslings, Colombards, and Gewurtztraminers, usually are complemented by foods and seasonings with a natural sweetness—ripe fruits and berries, cashews, tarragon and fennel, nutmeg and cinnamon, etc.

These wines can contribute their sweetness to sauces, soups and desserts when used as an ingredient. Using the wine as an ingredient also accentuates the complementary flavors of the wine (as the beverage) and the food.

Since sweetness can reduce the perception of acidity, sweeter wines go well with more acidic foods like sorrel, or those seasoned with citrus (like cerviche) or low levels of vinegar (beurre blanc sauces).

Saltier foods like ham, prosciutto, and those seasoned with soy sauce work well with wines with some sweetness, since sweetness also reduces the perception of saltiness.

Most vegetables have acids that are not 'friendly' to wine; some, such as spinach, sorrel, artichokes, and asparagus can be especially deadly to wine. A wine with some sweetness and good fruit can balance these acids. Combining the vegetables with creams, butters, oils and sweeter seasonings can also help in diluting their potentially devastating effect on wine.

A final word of caution: when combining a sweeter wine with sugary sweet desserts (those artificially sweetened with sugar), the wine will most likely taste sour. Even late harvest wines with higher levels of residual sugar are rarely sweet enough. They are more readily enjoyed with desserts of naturally ripened fruit, cheese and unsalted nuts.

PWV: ***Is there a logic to seasoning?***
KK: Seasoning is an art, not a science. Success is based partly on experience, partly on intuition. Our approach is to simplify the process to make successful results easier to achieve. We always season with restraint, then taste the food with the wine. More can be added later.

Serving temperature is also important. Cool foods need more seasoning since cold temperatures subdue flavor. (This is also true for wine.) Conversely, warmer temperatures tend to increase flavor.

Another way I simplify the process is by dividing seasonings into two categories. The first is botanical, which helps me understand organic similarities. The second is a grouping by common flavor characteristics, which reminds me of the range of alternatives and helps me to avoid a seasoning rut. (Although I admit to having favorites.)

Botanical Groupings divide herbs and some spices into three major groups. First is the *Carrot Family (Umbelliferae)* including many familiar herbs that look alike while growing: dill, anise, fennel, cumin, caraway, the parsleys and corianders, chervil, celery and lovage.

The second major herb family is the *Mint Family (Labitae)*, whose essential oils are in hairlike glands in the leaf and stem. These include all the various mints, thymes, sages, rosemary, bergamot, oregano and marjoram.

Tarragon is the only significant herb from the *Daisy Family*, although this

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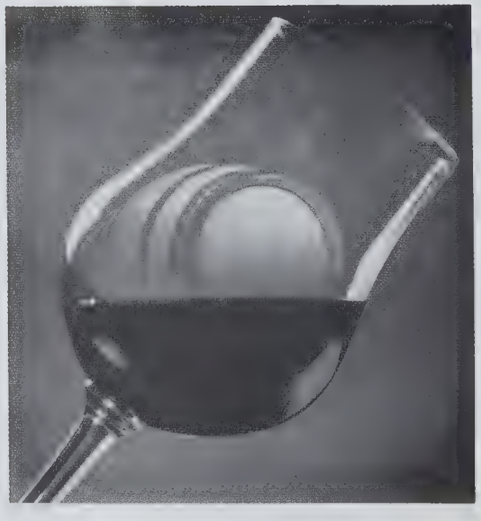

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third family also gives us the bitter greens that are not 'wine friendly', like chicory, escarole, endive, dandelion and artichoke.

Other botanical groups incorporating important seasonings we usually consider foods come from the *Nightshade, Lily and Cabbage Families.*

The *Nightshade Family (Solanum)*, in addition to potatoes and eggplant, gives us a wide variety of tomatoes and peppers. The tomato is usually complementary to white wines that are richer in flavor as well as most red wines (with the exception of Cabernet Sauvignon, which tends to taste metallic when combined with tomato).

Peppers contain varying intensities of hot compounds called 'capsaicins'. Mild anaheim and bell peppers are wonderful with dry Chardonnays, Pinot or Fume Blancs, Chenin Blancs, and Pinot Noir; some hotter varieties work well with full-bodied, peppery Zinfandels, Petite Sirahs, Syrahs, Charbonos, and Barberas.

The *Lily Family (Liliaceae)* includes chives, scallions, leeks, onions, garlic, shallots, and asparagus. Freshness usually indicates milder flavors; the older the herb, the stronger the flavors. Milder members can be successfully paired with white wines and more elegant older reds; stronger members (or less fresh ones) are best paired with robust red or white wines.

Members of the *Cabbage Family (Cruciferae)*, like those in the Lily family, contain many sulphur-based compounds that are released when these herbs are cut or cooked. In addition to broccoli, cauliflower, cabbage and other 'heads', this family includes the spices of mustard and horseradish, both of which provide very hot compounds.

The mustard seed develops a pungency when broken or wetted, which is destroyed by too much heat. Its hotness can also be soothed for use with wine by mixing with sour or whipped cream, or by using it as an ingredient in cream or butter sauces and mayonnaise. Dry styles of Fume Blanc, Zinfandel and Petite Sirah have a natural affinity for mustard.

The second method of grouping seasonings by common flavor characteristics is a simpler method. The ones I use most frequently with wine are:

Hot Compounds, which include various pepper 'berries', chili-type peppers, ginger, mustards, curry, and clove.

Licorice Compounds (which complement some styles of Chardonnay and many red wines): mints, tarragon, fennel, anise, basil, caraway and licorice.

Resinous Compounds: sages, thymes, rosemary and oregano.

Sweet Compounds: cinnamon, nutmeg, mace, allspice.

Citric Compounds: citrus, lemon basil, lemon thyme, cardamom.

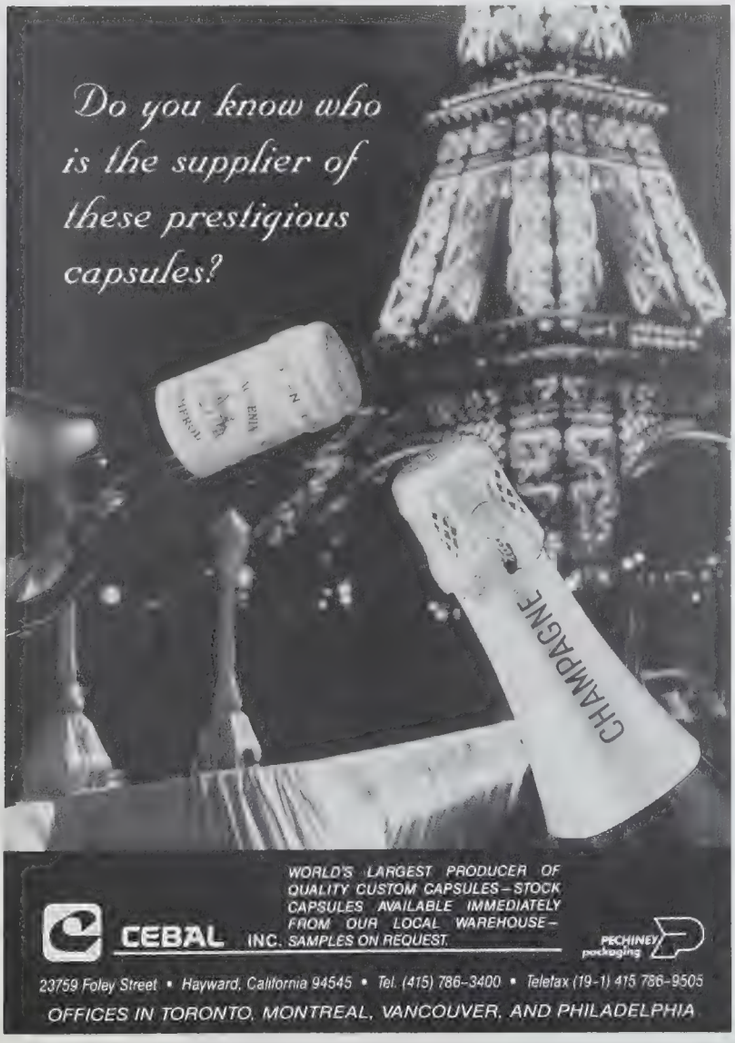
PWV: ***What are the effects of salt and wine when used together?***

KK: Salt is the most common seasoning. When used excessively, it can negatively affect wine by temporarily blocking the taste receptors. Used in greater quantities, it can react with the acid and tannin in wine to convey a metallic sensation to the palate. Used with restraint, it can enhance flavors.

A careful use of salt in food can reduce the perception of excessive acidity in wine, either as a beverage or as an ingredient in cooking.

KK: We have covered a broad range of factors and ideas in this discussion of guidelines for creating successful synergistic combinations of food and wine. A distillation of all the information should encourage a respect for the wine, an effort to identify and enhance its style, and a commitment to choose seasonings thoughtfully to link the food to the wine.

When it works, everyone wins! ■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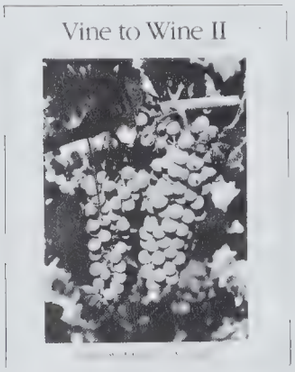

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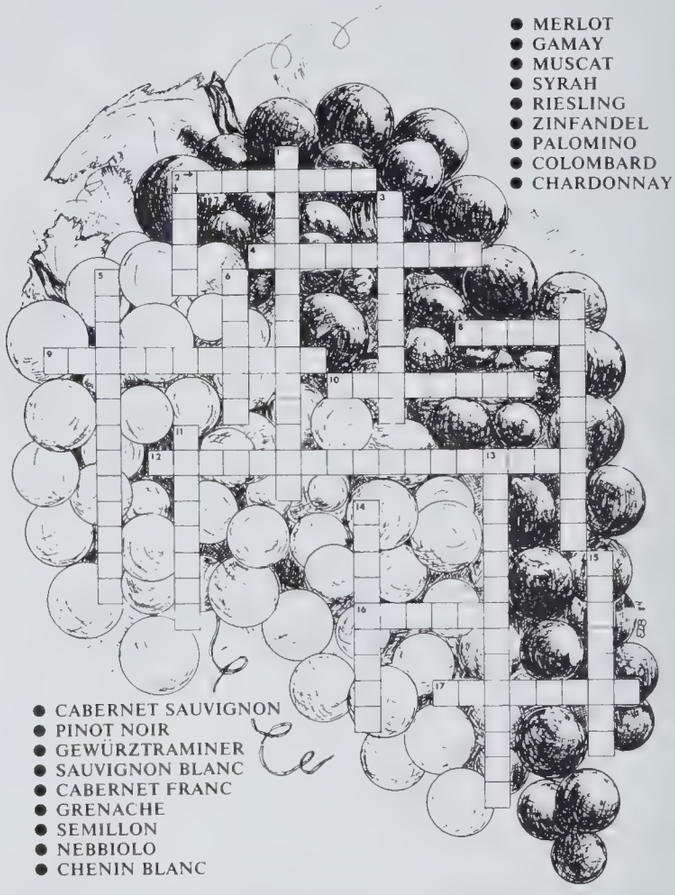
GREAT GRAPES

Listed are some famous *vinifera* *grapes. Grow them in their proper grid spaces to give each of them a number. Then, transfer them by number to their descriptions below



Red (a.k.a. Black) Grapes

2. Down—The chief Beaujolais (France) grape, making fruity, fragrant, red wines and lively California rosés and varietals called (2 Down) Noir.
2. Across—Blended into rosés and full reds in Rhône, France, and Rioja, Spain, and into popular rosé's and generic jug wines in California.
3. —A native of the U.S., Hungary, or Italy? No one's certain yet, but California claimed it and turns it into many kinds of reds, whites and rosé.
4. —Makes the great red Burgundies in France and adds body to Champagne. France forms velvety, agreeable wines from it, but this hard-to-grow and process grape continues to challenge (and defy) California's wine industry.
5. —Especially used in the Loire and Bordeaux regions of France for pleasurable 'Cabernet' reds and rosés.
6. —Used in Bordeaux claret and some California Cabernet Sauvignon varietal wines to balance and round out Cabernet Sauvignon's assertiveness.
8. —Potent reds. Another grape favored in Rhône, France.
12. —Makes powerful reds that usually need wood and bottle ageing.
15. —An Italian favorite, especially in Piedmont; complex, ageable wines.

White Grapes

1. —Forms distinctive sweet and dry Bordeaux, Loire, and California wines. Also known as 'Fumé Blanc'.
7. —Popular and important in white Burgundy, Champagne, and dry California table wines.
9. —Used in the Loire and California for fruity, textured, dry and sweetish wines.
10. —Called the greatest white; perfumed, fruity, complex wines.
11. —Spain's main Sherry grape.
13. —The 'spicy' grape; savory, aromatic, dry or slightly sweet whites.
14. —Main grape in California 'Chablis'; well-liked as a varietal.
16. —World-famous grape increasing in U.S. popularity. Can be black, but is usually white; grapey, fragrant wines.
17. —This grape and #10 grape can develop *botrytis cinerea*.

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DECEMBER 1, Thursday

Current Topics in Winegrape Pest Management / Sect #882E02 An update for PCAs and vineyard owners. University researchers will share information on: Powdery mildew and fungicides; Environmental parameters affecting bunch rot; Eutypa control strategies; Mites and twig borers and Outlook for phylloxera; Economic injury levels for spidermites; Mealy bug I.D. and control; and Minor nematodes and control possibilities. **Coordinator:** Jim Wolpert, PhD, Viticulture Extension Specialist, Dept. of Vit. & Enol., UCD. **Time:** 9am to 4pm. **Location:** Orchard Room, University Extension Center, Extension Center Drive (off Hutchison), UCD. **Fee:** $65 (includes lunch), pre-enroll by Nov. 23.

DECEMBER 3, Saturday

Rhone Varietal Production in California / Sect #882E33 Many small California producers will examine production strategies and Rhone varietals suitable to California. The geography and production areas of the Rhone will be covered, followed by a viticultural discussion of Rhone varieties with an emphasis on those planted in California and the problem of bud wood importation. Production variables focusing on the role of grape maturity, cap management, and whole cluster fermentation on wine style will be discussed. There will be a series of varietal tastings comparing French and California versions of the following varieties: Syrah, Grenache, Mourvedre (Mataro), Viognier, Marsanne and Rousanne. **Coordinators:** John Buechsenstein and Steven Edmunds. **Time:** 9am to 4:30pm. **Location:** Clubrooms I & II, Faculty Club, Old Davis Road, UCD. **Fee:** $100 (includes lunch), pre-enroll by Nov. 23.

DECEMBER 6, Tuesday

Diagnosis of Nutritional Needs in Grapevines / Sect #882E08 Instructors from UC faculty, Cooperative Extension and private industry offer a practical approach to diagnosis of nutritional problems in vineyards. Emphasized are: sampling (of tissues, juice, and through visual inspection), discussion and demonstraton of analytical methods, interpretation of data, and assessment of critical levels of a number of important minerals and amino acids. **Coordinator:** Jim Wolpert, PhD, Viticulture Extension Specialist, Dept. of Vit. & Enol., UCD. **Time:** 9am to 4pm. **Location:** Orchard Room, University Extension Center, Extension Center Drive (off Hutchinson), UCD. **Fee:** $65 (includes box lunch), pre-enroll by Nov. 29.

DECEMBER 10, Saturday

Introduction to Wine Analysis / Sect #882E20 Provides home winemakers an opportunity to learn and perform basic wine analysis. The class combines lecture, demonstration, and hands-on lab work for the following tests: free and total SO_2, volatile and titratable acidity, pH, malolactic paper chromatography and total alcohol. Participants should bring several 750ml samples of their own wines to test during the class, although samples wines will also be provided. Class is limited to 21 students. Sack lunch and old clothes recommended. **Instructor:** Ted Miller, cellarmaster, Dept. of Vit. & Enol., UCD. **Time:** 8am to 5pm. **Location:** Room 123, Enology Building, UCD. **Fee:** $100 (includes lab supplies), pre-enroll by Dec. 2.

JAN. 31 to FEB. 2, Tuesday to Thursday

Viticulture Short Course / Sect #883E01 An update for commercial grapegrowers combining latest research with a review of current vineyard management practices. Topics include: Grapevine Physiology (cycle of vine growth, water and photosynthesis, roots and root function); Vineyard Establishment (preplanting decisions, rootstock and cultivars, soils and modification, selection and handling of planting stock, and spacing and trellising); Vineyard Management (irrigation systems and measurement, frost protection, training, pruning and thinning, macro and micro fertilization, diagnostic methods, and mechanization); and Pest Management (powdery mildew, bunch rot, diagnosis, common insects and mites, and the clean stock program). **Coordinator:** James Wolpert, PhD, Viticulture Extension Specialist, Dept. of Vit. & Enol., UCD. **Time:** 8am to 9pm, Tuesday; 8am to 5pm, Wednesday; 8am to 2pm, Thursday. **Location:** Freeborn Hall, UCD. **Fee:** $275 (includes 3 lunches, 1 dinner), pre-enroll by Jan. 16.

FEBRUARY 4—5, Saturday / Sunday

Wine Filtration Short Course / Sect #883E13 Combines theory of filtration with lab exercises and manufacturer demonstrations to provide participants with a basis for solving filtration problems and choosing filtration systems for particular applications. There will be group participation in lab scale filtrations applying concepts learned in lectures. Topics will include: Overview of filtration systems; Determining filtration efficiency; Diatomaceous earth filtration; Crossflow filtration; and Fining agents for clarification prior to filtration. Labs will include: Pre-filtration treatments and effects on filterability; Microbiological detection; Flow rates

through various size membranes,;Determining pump characteristics and pressure/flow relationships; and Plotting silting efficiency data. Demonstrations to include a lees press, a D.E. system, membrane filtration, sterile pads, and a crossflow system. **Instructor:** Roger Boulton, PhD, assoc. professor, Dept. of Vit. & Enol., UCD. **Time** 8:30am to 5pm, Saturday; 8:30am to 4:15pm, Sunday. **Location:** Room 120, Wickson Hall, UCD. **Fee:** $225 (includes 2 lunches), pre-enroll by Jan. 27.

FEBRUARY 4, Saturday

Establishing the Home Vineyard / Sect #883E09 For serious home winemakers, who wish to establish their own vineyard for quality wine production. Topics include: Variety and site selection, Land preparation, Vineyard layout, Mineral nutrition, Erosion control, Irrigation, Pest control, and Training and pruning. Vine pruning will be demonstrated in vineyard if weather permits. Sack lunch and old clothes recommended. **Instructors:** Nancy Rosner and Eddy Szyjewicz, DeVine Consultants, Los Gatos, CA. **Time:** 9am to 4pm. **Location:** Orchard Room, University Extension Center, Extension Center Drive (off Hutchison), UCD. **Fee:** $70, pre-enroll by Jan. 27.

FEBRUARY 10, Friday

Canopy Assessment and Management / Sect #883E08 Research review and update on canopy management systems. Begins with canopy assessment and management techniques and includes Dr. Richard Smart's New Zealand system. Andy Bledsoe of Robert Mondavi Winery will lecture on canopy management and wine quality. Dr. Marois of UCD Dept. of Plant Pathology will lecture on canopy management and disease control. Includes a visit to the UCD vineyard to view trellis systems in the UCD research program. **Instructor:** Mark Kliewer, PhD, professor, Dept. of Vit. & Enol., UCD. **Time:** 9am to 4pm. **Location:** Clubroom II, University Club, Old Davis Road, UCD. **Fee:** $90 (includes lunch), pre-enroll by Feb. 3.

FEB. 11–12, Saturday + Sunday

Introduction to Sensory Evaluation of Wine / Sect #883E06 A beginner's class to improve the critical tasting ability of novice enophiles which includes a structured introduction to basic aspects of sensory evaluation. Different components of wine appearance, aroma, and flavor will be studied. Topics include: origins of desirable and undesirable flavors in wine; sensory contributions of oak and bottle ageing; and correct use of wine terminology and scorecards. **Instructor:** John Buechsenstein, winemaker, McDowell Valley Vineyard. **Time:** 9am to 4:30pm. **Location:** Lounge, University Club, Old Davis Road, UCD. **Fee:** $225 (includes 2 lunches), pre-enroll by Feb. 3.

FEBRUARY 23, Thursday

Winery Profitability: Planning for Growth / Sect #883E15 To help winery executive officers and controllers examine the variables affecting winery growth and the implications for winery profitability. Industry and University speakers will encourage audience interaction on the market outlook including: an economic outlook and its implications for fine wine consumption; changes in consumption habits (including the competitiveness of imports); and changes in the distribution structure. The Grape Supply topic will include analysis of current supply, contracts and pricing issues. Additional topics are: financing issues such as interest rates, availability of credit, and managing funds for self-financed growth. A discussion on winery profitability will include how growth affects profitability and maturity curves. **Instructors:** Kirby Moulton, PhD, Agricultural Extension Economist, UC Berkeley; and George Schofield, Schofield Associates, St. Helena, CA. **Time:** 9am to 4:30pm. **Location:** Embassy Suites, 1075 California Blvd., Napa, CA. **Fee:** $125 (includes lunch), pre-enroll by Jan. 16.

FEBRUARY 25, Saturday

Introduction to Wine Analysis / Sect #883E04 See December 10 above for course description. **Instructor:** Ted Miller, cellarmaster, Dept. of Vit. & Enol., UCD. **Time:** 8am to 5pm. **Location:** Room 123, Enology Building, UCD. **Fee:** $100 (includes lab supplies), pre-enroll by Feb. 17.

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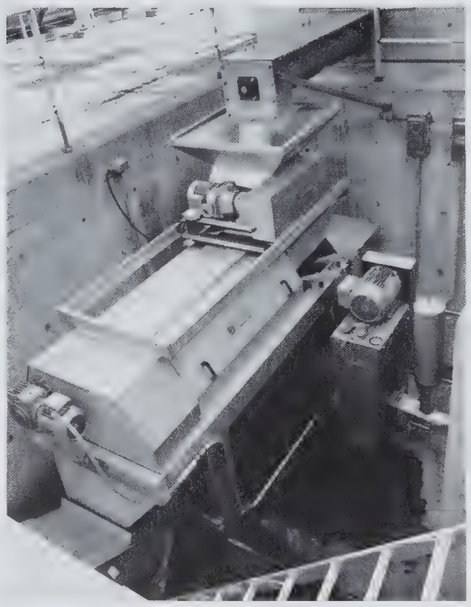

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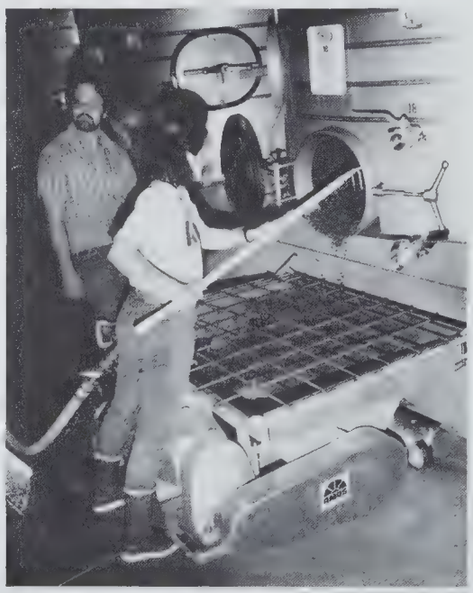

S-Tech RLS, Inc. has introduced three different capacitymodels of the ATM pump from Amos designed to process 15, 25 or 50 tons per hour. Each pump consists of a feed hopper with auger. The pumps operate at a low RPM to provide a smooth gentle handling of grapes from a stemmer/crusher or grape skins from a fermentation tank. The ATM pumps can be ordered with a varidrive unit for processing flexibility.

Contact: Jack Squires, S-Tech RLS, Inc., P.O. Box 20188, San Jose, CA 95160; telephone: 408/268-5537. OR: RLS Equipment Co., Inc., PO Box 282, Egg Harbor City, NJ 08215; telephone: 609/965-0074 or 1-800/527-0197.

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SEN Machines, Inc., is the supplier for Armbruster stemmer/crushers made in West Germany. The all-stainless unit comes in capacity models of 6, 15, 25, and 50 tons per hour. The machine features a removeable stripping cylinder which comes in either high-impact polypropylene or stainless steel. Both the cylinder and the stainless steel beater bar can counter-rotate for complete berry removal. The food-grade crush rollers are adjustable up to 1-inch clearance and come with fixed or variable speed drive.

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Contact: SEN Machines, Inc., 1350 Industrial Avenue, Suite G, Petaluma, CA 94952; telephone: 707/763-4844.

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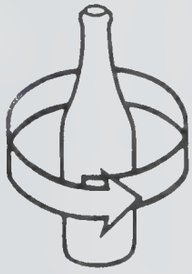

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Guerrilla Marketing

One of the Most Stupid Mistakes in Marketing

Jay Conrad Levinson

Very frequently, a marketing honcho at a winery will develop a brilliant strategy, plan a first-rate media and mailing campaign, then attempt to save money by producing the marketing materials as a do-it-yourself project. This is unsmart, unintelligent, and stupid.

The production of your marketing materials is an opportunity to protect the marketing investment in your wines, not to undermine it with shoddy-looking ads and boring-sounding letters. If ever there was a place not to do it yourself, it is in the creation and production of your marketing materials.

Yet, many wineries will invest millions of dollars in marketing, and then try to save hundreds of dollars in production. That is stupid.

In fact, the only thing more stupid than investing too little in production is investing too much. In 1986, the average TV commercial cost $93,000 to produce—$93,000! Great TV commercials can come in at under $1,000. By great I mean sales-winning, not award-winning. Any well-financed artist can create award-winning marketing, but it takes a genius to create sales-winning marketing.

People who can do that usually do it for a living, and those are the people who should do it for you. In order to create effective marketing materials, expertise is required in at least ten areas:

1. ***The idea itself*** – Do you know a good one from a bad one?
2. ***Copywriting*** – Did you know there are magic words in marketing? These include: You, Free, New, Results, Proven, Guaranteed, Now, Introducing, Save, Sale, and Easy. Each holds an emotional impact far beyond the word itself. Many are especially pertinent to the wine industry.
3. ***Graphics*** – Just because your girlfriend went to art school doesn't mean she can design a motivating brochure.
4. ***Pictures*** – Should they be illustrations or photographs? There are right and wrong answers to that question. The pros know the right answers from the wrong ones. Do you? (Hint: in wine marketing, photos are almost always better than illustrations. And wine is a highly visual product.)
5. ***Typography*** – Many do-it-yourselfers select a type that looks gorgeous, but gives migraines to readers.
6. ***Paste-up and photostatting*** – Even great words and photos can look bad with an amateurish paste-up job.
7. ***Printing*** – Many a brilliant marketing tool has been unintentionally sabotaged by off-register printing.
8. ***Headlines, opening lines and P.S.'s*** – Just because you had straight A's in English doesn't mean you can write a headline or opening line that paves the way to a sale.
9. ***Media idiosyncracies*** – Do you know which publications may muddy up your ads? Which media cut spots after 28 instead of 30 seconds?
10. ***Video and audio production*** – The production is often as important as the message itself. It can make or break a spot.

You need judgement, not talent, in these areas. Even if you have talent, it's unlikely you'll be talented in all ten areas. That's why it's smart to use a pro and stupid to save pennies when dollars are at stake. Guerrillas are never stupid.

Your wines will be judged in part by the marketing materials—signs, boxes, front labels, back labels, hangtags, etc. that accompany them. After all the time and effort you put into producing a great wine, don't undermine it by putting less than a professional effort into its marketing. ■

(Jay Conrad Levinson is the author of "Guerrilla Marketing." His Guerrilla Marketing Newsletter, videotape, audiotapes and books are available by calling 800-621-0851, Ext. 140.)

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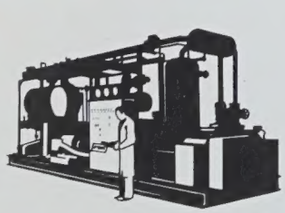

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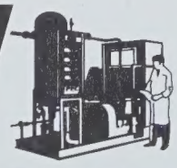

Case Study #3
The Maurice Et Charles Vinaigrette Package

Maurice O. Amzallag made a popular vinaigrette when he was owner/operator of the 4-star rated Maurice et Charles Bisto of San Rafael. So popular, in fact, that Maurice began bottling and selling his product. Soon he wanted to expand his line to nine varieties. His vinaigrette needed a facé liff in the form of an updated label to compete for shelf space in the expanding California gourmet dressing/sauce category.

Colonna & Farrell decided on a new look which maintains the integrity of the company's French heritage while giving the product a more clearly defined upscale image. The new label features a contemporary red, white and blue French inspired design and a bold red neck wrap. Elements of modern script and traditional Roman type combine with borders of red and blue for a strong, readable shelf presence. The Maurice et Charles label offers a graphic that is very much representative of the new individualism. This signature stamps the product as a genuine example of the gourmet market.

"An effective and successful design must seize the essential features that set a company apart and translate these into memorable visual images. When this takes place, the uniqueness of a company is captured in the uniqueness of the design."

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